JPRS-TND-86-020

26 SEPTEMBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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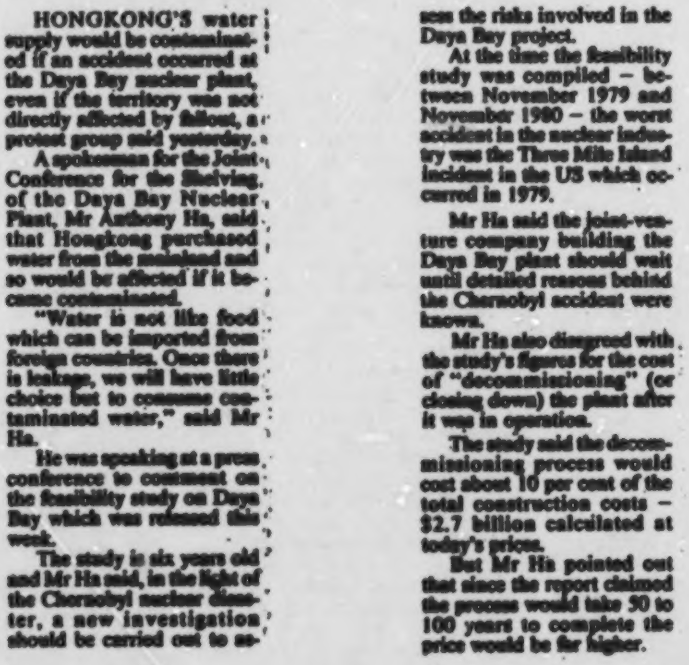
HONG KONG

DAMAGE TO WATER SUPPLY FROM DAYA BAY FEARED

Hong Kong SOUTH CHINA MORNING POST in English 31 Jul 86 p 4

[Text]



HONGKONG'S water supply would be contaminated if an accident occurred at the Daya Bay nuclear plant, even if the territory was not directly affected by fallout, a protest group said yesterday.

A spokesman for the Joint Conference for the Shelving of the Daya Bay Nuclear Plant, Mr Anthony Ha, said that Hongkong purchased water from the mainland and so would be affected if it became contaminated.

"Water is not like food which can be imported from foreign countries. Once there is leakage, we will have little choice but to consume contaminated water," said Mr Ha.

He was speaking at a press conference to comment on the feasibility study on Daya Bay which was released this week.

The study is six years old and Mr Ha said, in the light of the Chernobyl nuclear disaster, a new investigation should be carried out to assess the risks involved in the Daya Bay project.

At the time the feasibility study was compiled – between November 1979 and November 1980 – the worst accident in the nuclear industry was the Three Mile Island incident in the US which occurred in 1979.

Mr Ha said the joint-venture company building the Daya Bay plant should wait until detailed reasons behind the Chernobyl accident were known.

Mr Ha also disagreed with the study's figures for the cost of "decommissioning" (or closing down) the plant after it was in operation.

The study said the decommissioning process would cost about 10 per cent of the total construction costs – $2.7 billion calculated at today's prices.

But Mr Ha pointed out that since the report claimed the process would take 30 to 100 years to complete the price would be far higher.

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CSO: 5150/0163

HONG KONG

PAPER PUBLISHES SPECIAL REPORTAGE ON DAYA BAY PROJECT

Government Answers to Questions

Hong Kong HONGKONG STANDARD in English 18 Jul 86 p 13

[Text] COMMENTS by the Government on the questions raised by the Committee of Concern for Nuclear Energy and the Umelco members on the Daya Bay nuclear power plant.

QUESTION: Since the cause of the Chernobyl incident has not yet been fully established, it is premature for Government to accept the view of the experts of the Daya Bay project that the Soviet incident was caused by the use of graphite.

ANSWER: Pending a full report, if there is going to be one, on the Chernobyl incident, the Government has not ventured any suggestion as to the cause of the incident. What has been established and accepted by the Government is that the reactors used at the Chernobyl plant are the graphite moderated RBMK type and are entirely different in design from the pressurised water reactors (PWRs) to be installed at Daya Bay, and that the PWRs will be of a higher safety standard and more technologically advanced than the RBMK. The Government has asked the consultants (United Kingdom Atomic Energy Authority at Harwell) to take into account any lessons which may be learnt from the Chernobyl incident in the development of accident probability assessment and outline contingency plans.

The Government reportedly commissioned the United Kingdom Atomic Energy Authority last year to conduct five studies on the Daya Bay project. The first study is of the feasibility of the project; the second of the possible accidents which may occur and the effects on Hongkong; and the third of the emergency measures which have to be taken in case of such accidents. It is irresponsible of the Government to have supported the project even before the second and the third studies are completed.

Before ExCo decided on the project in January 1985, did ExCo Members have the chance to consider any reports on the safety of the project?

As stated by FS in the Legislative Council on May 7, the Executive Council was fully informed of and consulted on all stages of development in the negotiations between China Light and Power (CLP) and China. In January 1985, the Executive Council advised that the Government should inform the Hongkong Nuclear Investment Company (HKNIC) and CLP that the Government had no objection to their entering contractual arrangements prepared for the formation of the Joint Venture Company, and purchase, initially by HKNIC and finally by CLP, of electricity from the project. An important consideration taken into account by the Executive Council was of course the safety aspect of the proposed nuclear power plant in Daya Bay. In this connection, the Council noted that the design of the Daya Bay Station will be identical to that of Units 5 and 6 of the Gravelines Nuclear Power Station in France and that it would adopt proven French technology. It was also noted that a National Nuclear Safety Authority directly responsible to the State Council, has been established by China and it would be assisted by the French Central Service for the Safety of Nuclear. Installations which would be involved in both the licensing procedures for the Daya Bay plant and the setting up of a Chinese nuclear inspectorate. The inspectorate would carry out surveillance of nuclear installations and would be responsible for ensuring that nuclear plants operate in compliance with Chinese safety regulations which would reflect nuclear safety standards applicable in France and adopted by the International Atomic Energy Agency and the International Commission on Radiological Protection.

It should be pointed out that the feasibility study of the project ws compiled by China Light and Power Co

Ltd and the Guangdong Power Co in 1981, and it is not within the terms of reference of the Harwell consultancy study commissioned by the Hongkong Government. What the Government has asked the Harwell consultants to do is to conduct five studies which are to provide technical evaluation of the radiation monitoring programme; to produce an assessment study of the probability of different accidents at the nuclear power station and the consequences for Hongkong; to develop the design of an outline contingency plan for Hongkong; to provide initial training for selected Government officers and to advise on an effective public education programme on nuclear related matters. The consultancy studies were intended to enable the Government to provide public reassurance and to take effective action in the unlikely event of an accident. The purpose of these studies is to provide the Government with an independent and expert evaluation of the environmental and safety impacts of the plant on Hongkong.

Presumably China has already completed studies on the environmental impact of the Daya Bay Plant. Did the Hongkong Government consider the environmental impact reports compiled by the Chinese authorities before making the decision on the Daya Bay project?

The present site at Daya Bay was chosen by the Chinese authorities on the basis of the feasibility study mentioned above which took into account the general topographical and meteorological factors covering the surrounding areas including that of Hongkong. The Guangdong Nuclear Power Joint Venture Company (GNPJVC) is now conducting a full environmental impact report and an initial safety analysis report in relation to the Daya Bay project as a first stage of the licensing procedure. These reports will cover the implications for Hongkong. A GNPJVC delegation visited Hongkong in May this year with a view to collecting data for their studies. The Hongkong Government is assisting GNPJVC in obtaining the necessary information.

Will the Government consider asking the contractor, Electricite de France (EdF), to arrange an independent inspection before the PWRs are put into operation?

As stated by the Government, the responsibility for designing, constructing and operating the Daya Bay nuclear plant rests with the GNPJVC. The Hongkong Government is therefore not in a position to ask the French National Utility Electricite de France to conduct an inspection before the PWRs are put into operation.

In view of the serious implications of the project on the well-being of the Hongkong people, the latter should have been properly consulted before the project was given the support of the Hongkong Government.

The Executive Council has been consulted on the project. The Government has, in addition, issued numerous public statements and press releases on this project. The public have been made aware of the developments and their views, expressed through various channels, and already taken into account by the Government before it raised no objection in January 1985 to HKNIC to enter into contractual arrangements with their Chinese counterpart to form the GNPJVC.

Is it intended that environmental matters relating to the Daya Bay plant will be put to the Environment Protectional Committee for advice? What are the reasons for putting the monitoring of radioactivity in the charge of the Royal Observatory rather than the Environmental Protection? What role does the Medical and Health Department have in the monitoring?

The Royal Observatory is charged with the responsibility of radiation monitoring because it is best equipped within the Government to carry out the job. Other departments do contribute input to the monitoring process. The Medical and Health Services Department, for example, advices on the health impacts of radiation. The Environmental Protection Department, on the other hand, provides input on broad environmental issues. A working group with representatives from the Environmental Protection Department, the Royal Observatory, the Medical and Health Services Department, the Electrical and Mechanical Services Department and Security Branch, co-ordinated by the Economic Services Branch, is in place to consider the safety and environmental issues. The present arrangement is considered effective in co-ordinating the various activities within the Government.

Answers from Quangdong Company

Hong Kong HONGKONG STANDARD in English 18 Jul 86 pp 11, 12

[Text] ANSWERS provided by the Guangdong nuclear power joint venture company to questions raised by Umelco on the safety of the Daya Bay project.

QUESTION: PWRs are not as safe as the Government has claimed them to be. Only as recently as 1979, a meltdown occurred in a PWR on Three Mile Island, causing inconsiderable panic.

Also, according to the findings of the Sizewell Inquiry conducted in the United Kingdom two years ago, PWRs have more than [illegible] design defects and most of them are considered to be serious. These defects have since not yet been rectified.

ANSWER: THE Three Mile Island incident, whilst being serious in a number of aspects, resulted in insignificant risk and effect on the surrounding population. The main factor which prevented environmental impact was the containment of the nuclear plant.

Since the Three Mile Island incident, improvements have been made to overcome concerns that arose and these improvements have been incorporated into the French programme and the Daya Bay design.

The report on the Sizewell enquiry has not yet been published and so the outcome of all the issues raised there has not yet been stated. We are aware that approximately 80 points were raised by the UK Nuclear Installations Inspectorate (NII), which is the UK licensing authority. However, we believe these are not "defects" and comment further as follows:

- The PWR design proposed for the UK is not a replication of an existing plant and is not derived from a long series of standardised plants as is the case for Daya Bay. On the contrary, it incorporates features developed specifically by the UK utility, CEGB. It is also the first PWR that will be licensed by the NII.
- Our understanding is that the majority of the 80 points raised by the NII were in the nature of requests for more information and substantiation and many were not major. We understand that most were satisfactorily answered without a need for any changes. They should not, therefore, be thought of as "defects."

We understand 6 points were considered to be more significant, but even in these cases, we are only aware of one point where a modification is likely. That one point apparently concerned an improvement of fire protection standards for cabling. Such an improvement has already been made for the Daya Bay project.

THE protective shield of the Daya Bay plant may not be able to resist the enormous pressure and heat from the core of the plant in the event of a meltdown.

THE Emergency Core Cooling Systems have been developed to prevent a core meltdown. They operate automatically and are engineered to very high standards of reliability, which include complete duplication of all functions (that is, 100 percent backup).

The containment is designed to withstand a sudden complete break in the main nuclear system whereby the normal flow of pressurised water through the reactor core is lost (referred to as a "loss of coolant accident" or LOCA).

This is an extremely unlikely event, bearing in mind that the walls of the pipework carrying the pressurised water are 7 cm thick. In the event of a loss of coolant accident, the emergency core cooling systems operate to prevent overheating of the core, and the discharge of hot pressurised water from wherever the break has occurred will be held inside the containment.

Sprays of cold water operate automatically inside the containment to condense some of the steam that forms from the escaping pressurised water.

The containment is designed and tested to withstand a pressure of 5 bars (five times atmospheric pressure). This is the highest pressure that can occur in the event of the most serious loss of coolant accident occurring when the reactor was operating at full load.

The complete loss of coolant accident is the worst accident considered to be possible and is the design basis for the containment and safety systems. The nuclear plant design has to be able to prevent any radioactive release into the environment in the event of such an incident.

Further analyses are, however, performed on more serious incidents, including a meltdown. The criterion for French plant is that none of these more serious incidents must lead to unacceptable consequences.

In France, consequiences are deemed unacceptable if they require evacuation more than 10 km from the power station. All provisions needed to achieve this level of safety will be incorporated at Daya Bay.

In practice, the analyses indicate a margin of safety, that is, serious incidents such as a meltdown probably will not require evacuation as far away as 10 km. These conclusions are supported from other sources:

- Studies have been under way for several years, particularly in the USA, on the effects of severe accidents in nuclear plants.

These studies are concluding that incidents such as a meltdown will not lead to the extreme consequences that had previously been suggested. A major factor in this respect is a large pool of water that will form at the base of the containment in the event of a loss of coolant accident.

- In the Three Mile Island incident, a partial meltdown did occur. However, the pressure inside the containment did not rise above the level for which the containment was designed.

It can also be pointed out that the radioactive release inside the containment was far below the levels predicted by previous calculations.

HAVE any serious accidents even happened with the nuclear plant in France, whose contractor is responsible for building the nuclear plant in Daya Bay?

If the answer is in the affirmative, then what is the cause of the accidents and the casualty rate? Are there any contingency plans in France for evacuation in case of accidents?

THERE have been no serious accidents on nuclear plants in France. In the case of the French PWR series of plants from which Daya Bay is derived, there have been no incidents of any radioactive release even inside the containments. This represents a very high safety record.

There are contingency plans in France for the event of an incident at a nuclear station. They are established on a case-to-case basis, according to local conditions at each location.

The contingency plans do include the possibility of evacuation of areas in the immediate vicinity of the power station sites but, as stated previously, there are no circumstances where evacuation beyond 10 km from the site is envisaged.

ACCORDING to a lecturer (Mr Chow Cheun-ho) in the Department of Geography, Baptist College, Daya Bay is located in an earthquake-prone zone. The Daya Bay nuclear plant is therefore more vulnerable to damage caused by earthquakes.

THE seismicity of the Daya Bay area has been studied extensively both by PRC experts and independently by French and British experts.

Taking account of all available information including historical earthquake records, a design basis has been determined for the plant. This design basis means that the plant can be shut down safely without radioactive releases in the event of an earthquake causing a ground acceleration of 0.2g.

This figure is typical of other plants and all experts agreed it allows for the most severe earthquake that could be envisaged for the Daya Bay site.

Some experts considered it to be very conservative and that earthquakes could never reach this intensity.

Consequently, Daya Bay cannot reasonably be described as being in an "earthquake-prone" area and the plant cannot be described as being "vulnerable" to earthquake damage,

IT is understood that no insurance company has been willing to offer accident or third-party insurance to cover mishaps in nuclear plants. This could serve as evidence of the extremely dangerous nature of nuclear plants.

PROTECTION against liability for nuclear-related risks will be provided for Daya Bay in the same way as virtually all countries with nuclear power stations.

According to this practice, the ultimate protection takes the form of a Government-supported indemnity rather than insurance. Such provisions have already been made by the PRC Government.

THE nuclear industry in China is still at a very primitive stage and it is, therefore, naive to assume that high safety standards could be maintained for the Daya Bay project.

CHINA has established nuclear technology for military applications. However, the fact that Daya Bay will be the first commercial nuclear-generating plant in China has been perhaps the single most significant factor in determining the means of proceeding.

The strategy developed for managing the project and for contracting is based on extensive use of international standards and experience and participation by internationally-recognised contractors and consultants at all stages. In particular:

- The Daya Bay nuclear plan design is based on an established series of standardised plants in France. There are a total of 59 units of 900MW class of which 37 are in operation.
- The standards to be used for the design, manufacture and construction of the nuclear equipment are those applicable in France, together with certain relevant international standards.

The equipment will be designed and manufactured in France by the French contractor Framatome, which will also supervise its erection on site and participate in its commissioning and start-up.

- Contractors from France and other countries with experience on other nuclear projects will take a leading role in the civil works construction on site.
- The French utility Electricite de France (EdF) will take a leading role in the technical management of the project, including review of the work of other contractors both in Europe and in the PRC, the engineering of peripheral equipment and the design of the civil works for the nuclear equipment.
- An independent foreign Quality Assurance Consultant will be appointed.

[Material in slantlines printed in boldface]

There will be intensive training in France for staff involved in the operation and maintenance of the station. This will include "hands-on" experience on French stations and formal qualification issued by EdF for staff who reach the required standards in training.

/What consideration is being given to arrangements for disposing the nuclear waste products of the plant and where will the disposal take place?/

The solid waste produced during operation is considered in two categories as follows:

/High-Level Waste:/

The high-level waste arises in small quantities inside the nuclear fuel elements. When fuel is removed from the reactor, it will first be stored in controlled conditions on site to allow time for some decay of the most active fission products. It will later be removed from site in heavily-shielded containers. There are then two alternatives:

1. Either the fuel is stored long-term at a centralised facility, or

2. The fuel is reprocessed, during which the small proportion of active waste is removed and converted into a stable form of glass or ceramic. In this form, the waste is suitable for long-term disposal underground in geologically-stable rock formations.

PRC stated policy is to develop both of these alternatives.

/Intermediate and Low-Level Wastes:/

This covers a range of materials from chemicals and, during the operations of the reactor, down to overalls and shoes of operators that may have picked up a trace of radioactivity.

There will be the same type of plant at Daya Bay as on French stations and elsewhere which first feeds the waste into a concrete mix and sets the mix into drums.

A further layer of concrete is then added around the outside as a shield so that the blocks can be handled safely. These blocks are then removed from the site to controlled underground disposal locations.

The locations for nuclear waste disposal are being treated as a national PRC issue and are not yet selected. An investigation programme is underway however.

/Would it be possible to find an alternative site for Daya Bay in China further away from Hongkong and other populous areas?/

The Daya Bay site has been selected after consideration of the following major criteria:

Compliance with internationally-accepted standards for remoteness from population centres, including Hongkong, on the basis that evacuation plans for Hongkong are impracticable and must not be necessary

The need for acceptable rock foundation conditions and an acceptable distance from any active geological faults.

The need for large volumes of sea water to be available continuously for cooling purposes, without excessive silt or pollution, and the need for sea access of adequate draft for shipments to the site.

The need for transmission grid connections to both the Guangdong and Hongkong electricity distribution systems, to enable reliable and stable operation and transfer of power.

A suitable site further away than Daya Bay has not been identified.

/Since many of the major nuclear accidents in the past have reportedly been the result of human error (Chalk River, Canada 1952, Idaho 1985; Minnesota 1971, Brown's Ferry, Alabama 1975; Three Mile Island; Ohio 1985), what measures will be taken to ensure that mistakes, misunderstandings, misreadings, miscalculations and false assumptions will be avoided or minimised in the Daya Bay plant?/

The need for close attention to the qualifications and training of operators and the management of the power station organisation has been highlighted by incidents elsewhere.

There is, however, extensive protection in depth in the nuclear equipment which is there to maintain safe conditions both in the event of human error and in the event of equipment malfunctions. In plants of the type to be used at Daya Bay, this protection has been proven to be effective.

In reaching this standard of safety, there have been significant improvements resulting from incidents elsewhere, particularly the Three Mile Island incident. The improvements include:

Improvement in the so-called "man-machine" interface. For example, the layout of the control room and the presentation of information have been modified such that the operator is better able to judge the status of the plant and action to be taken.

Operating procedures for normal operation, incidents and accidents have been extensively revised and improved.

Much greater importance is now attached to operator training and qualifications. In addition, it is increasingly the practice to provide a simulator on site for continued training and this will be done at Daya Bay.

/What assurances are there that unforeseen political changes, a change in the allocation of financial resources, or corruption among officials in China will not hinder the construction of the plant or cause its safety standards to be lowered?/

The PRC has given a commitment from the highest level that safety will take first priority on the Daya Bay project.

As has already been stated, there is extensive international participation in the project with several layers of supervision and checks. This represents a higher level of supervision than is normal, say, on domestic French projects, and is being provided to ensure all contractors comply with the necessary standards.

/Has any consideration been given to building the latest design of nuclear reactor--known as an inherently safe reactor--which has no risk of a meltdown at Daya Bay instead of a PWR reactor?/

The so-called "inherently safe" reactor is so far only a concept which exists on paper. It has never been built and the detailed design work has not yet been undertaken. We are not aware of any firm plans to proceed with this concept.

For reasons stated previously, we would not want to pioneer a prototype design at Daya Bay. On the contrary, we have opted for an extremely well proven design with a history of safe operating experience.

/Will there be monitoring of the Daya Bay Plant within China close to the plant in order to detect high levels of radiation well before they reach Hongkong, and, if so, what communication will there be between the Chinese and Hongkong so that Hongkong is alerted before the radiation reaches Hongkong?/

There will be monitoring of radiation levels both within the power station site and in the vicinity. The monitoring equipment is extremely sensitive and can detect small changes in background radiation.

Since, on average, 70 percent of the power from Daya Bay will be fed to Hongkong, there will be close operational communications between the power station and the Hongkong system.

In addition, according to the terms of the Joint Venture Contract, the head of the operations department will be nominated by HKNIC. Consequently, the status of the plant will be known at all times in Hongkong, both during normal operation and in any abnormal situation.

Further lines of communication are for the Government to consider.

/In view of the declining price of oil and the continuing cheapness of coal, are the economic considerations that led the Government to support the Daya Bay project in 1983 still valid?/

/What, according to 1986 calculations, will be the financial benefits to the Hongkong consumers of obtaining electricity from the Daya Bay Plant in the 1990s instead of obtaining it from conventional oil or coal-fired plants?/

Detailed economic studies for the Daya Bay Power Project have been carried out many times since its inception in 1980.

The most significant economic study was conducted by the Government Consultants, Lazard Brothers, in 1984. In this study, various sensitivity scenarios were considered, including variations in the prices of fossil fuels.

It is believed that the Government was satisfied about the economics of the project as detailed in the report, including considerations of fossil fuel price variations, before they approved the go-ahead of the project.

The recent softening in oil and coal prices is considered to be temporary. Under the present fossil fuel prices, development of new mines will be greatly affected, which in turn will push the prices up eventually.

On the other hand, the nuclear power station will be able to benefit from the low interest rates currently prevailing.

The present export credit interest rate for China is 8.8 percent p.a., which is lower than the original planning figure of 9.5 percent p.a.

It is probable that the interest rate will reduce further later this year.

The present overall situation is that despite the softening of the prices of fossil fuels, nuclear generation is still likely to be cheaper than fossil-fired generation in the long run.

It should be pointed out that in order to provide addition protection to consumers in Hongkong, an article was negotiated in the Joint Venture Contracts which states that electricity to be purchased from the Guangdong Nuclear Investment Company under the Electricity Resale Contract will be limited to no higher than the cost of coal-fired electricity for the first six years of operation of the nuclear power station.

The calculation of cost of coal-fired electricity is defined in a formula specified in the Joint Venture Contracts which were approved by the Government.

/What plans for the construction of new conventional power stations in Hongkong by CLP have been cancelled as a result of the decision to build the Daya Bay Plant?

What would their capacity have been and for how long would they have been adequate to serve Hongkong's needs?

If the Daya Bay project is delayed or cancelled, will existing power stations in Hongkong be adequate to serve Hongkong's needs in the 1990s?/

The detailed generation development plans have previously been submitted to the Government.

In the study carried out by Lazard Brothers, another consultancy Burns & Roe was employed by the Government to consider the technical aspects of the nuclear power project, including its effects on the generation development plans in Hongkong.

Castle Peak Power Station will be completed by 1990 and without an additional plant being added to the system thereafter, there will be insufficient generation capacity to meet consumer demand in the 1990s, resulting in blackouts which will be detrimental to the economy of Hongkong.

The purchase of power from the nuclear power station will be able to meet the electricity demand growth of Hongkong consumers for the period up to 1995.

If the Daya Bay project is delayed or cancelled, the existing power stations in Hongkong will not be adequate to serve Hongkong's needs in the 1990s. A new coal-fired power station will have to be built for commissioning in the early 1990s.

A coal-fired power station having a capacity equivalent to the nuclear power purchase will cost approximately HK$17 billion, which will have to be found if this route were taken.

Information From Investment Company

Hong Kong HONGKONG STANDARD in English 18 Jul 86 p 24

[Text] WRITTEN requests for information put to the Hong Kong Nuclear Investment Co by Umelco on July 7, 1986.

On behalf of members of Umelco, the Umelco office wrote to the Hongkong Nuclear Investment Co on July 7, 1986 seeking the following information:—

1. Mr Walter Patterson has said that in the event of a meltdown in a PWR all the melting core material would collect at the bottom of the pressure vessel and burn its way through the vessel and through the concrete underneath and eventually into the ground below. Radiation would then escape through craters formed by the melted core material in the ground surrounding the plant. The JVC engineers are requested to comment on this and to provide the detailed calculations supporting their comments.

2. In the event of a loss of coolant in the primary circuit of a PWR cold water would be injected into the reactor core. The JVC engineers are requested to comment on whether the containment would be able to withstand the thermal shock caused by such an injection and to provide the detailed calculations supporting their comments.

3. The data behind the JVC engineers' statement that in the event of a worst-case hydrogen explosion in a PWR the outer containment would remain intact.

4. Comments from the JVC engineers on whether the outer containment would remain intact in the event of a steam explosion or combustion data supporting their comments.

5. Detailed data explaining the short-term and long-term radiation levels and dosages to human beings at points 10km from the plant, and in Hongkong, in the event of a worst-case accident at the Daya Bay Station with worst-case meteorological conditions in relation to Hongkong.

Answers to questions raised at the meeting on June 27, 1986 provided by the Hong Kong Nuclear Investment Co.

Question (1): What contracts have been signed (by parties concerned) on the Daya Bay Nuclear Plant Project up-to-date?

Answer (1): Contracts (and letters of intent) signed so far:

A. Between Partners of the Power Station

- Joint Venture Contract, GNIC/HKNIC
- Electricity Off-take Contract 'A', GNPJV/GNIC
- Electricity Off-take Contract 'B', GNPJVC/HKNIC
- Electricity Resale Contract, GNIC/HKNIC

GNPJVC: Guangdong Nuclear Power Joint Venture Company, Limited

GNIC: Guangdong Nuclear Investment Company, Limited

HKNIC: Hongkong Nuclear Investment Company, Limited

B. Between GNPJVC and other parties.

- Initial contract with EdF for preparatory engineering work prior to concluding main equipment contracts (this contract is no longer effective and had been upgraded by letter of intent for EdF Project Services Contract, see below).
- Contracts with three consultants to provide services in the assessment of bids from Framatome, GEC and EdF (these contracts are no longer

effective).

- Contract with Jilin Co (PRC) for the site formation (excavation and reclamation) work at site.
- Contract with Jialin Co for the structural excavation for the main building's foundations.
- Contract with the First Bureau of the Guangdong Power Co for the first stage breakwater on site.
- A number of small contracts (about 60 in number) for various works on site involved in establishing site services eg water, electricity supplies, temporary buildings, communications, lighting, slope protection, wharf construction and other aspects of sito infrastructure.
- A number of contracts to Hong Kong and PRC organisations to undertake data collection at and in the vicinity of the site, eg meteorological, geological, hydrographic.
- Letters of Intent to Framatome (Nuclear Island and Fuel Assemblies), GEC (Conventional Island) and EdF (Project Services).
- Contract with Bechtel for Project Support Services.
- Quality Assurance services and training.
- Contracts for legal consultancy services.

Question (2): How many other contracts are yet to be signed?

Answer (2): It is impossible to give a number as contracts will arise throughout the construction period. However the main contracts that will be signed may be summarised as follows:

- Framatome (Nuclear Island and Fuel Assemblies), GEC (Conventional Island) and EdF (Project Services) to supercede the letters of intent referred to in (1).
- Nuclear Island civil works.
- Conventional Island and balance of plant civil works.
- Other smaller civil works contracts.
- Loan Agreement with Bank of China.
- Interconnection Agreement with GNIC, HKNIC, Guangdong Power Company and China Light.
- Nuclear Island equipment erection.
- Conventional Island and balance of plant equipment erection.
- Other smaller equipment erection contracts.
- Balance of plant equipment supply contracts (about 23 in number) being peripheral equipment not included in the Framatome and GEC contracts.
- Contracts for the supply and enrichment of uranium to be used in the manufacture of nuclear fuel.
- Quality Assurance Consultancy Contract.
- Other miscellaneous contracts for specialist services, specialist staff, minor works on site, miscellaneous equipment etc.

Question (3): What contracts are expected to be signed in the next 3 months — please give approximate dates.

Answer (3): Contracts expected to be signed in the next 3 months are as follows:

- Framatome (Nuclear Island and Fuel Assemblies), GEC (Conventional Island) and EdF (Project Services) to supercede the letters of intent referred to in (1). Expected to be signed in August or September.
- Nuclear Island civil works. Expected to be signed in July or August.
- Loan Agreement with Bank of China. Expected to be signed in August.
- Interconnection Agreement with GNIC, HKNIC, Guangdong Power Company and China Light. Expected to be signed in August.
- Possibly some other miscellaneous contracts for minor work or services.

Question (4): What is the estimate of expenditure so far expanded in works at the Daya Bay site.

Answer (4): Expenditure to June 30, 1986 for the whole project is about US$90m:

- Site works Approx. 50%
- Land use fee for Daya Bay site; initial payments for FRA, GEC and EdF contracts; office facilities in Shenzhen; remuneration, etc. 50%.

Outstanding commitments at June 30, June 1986 is estimated to be US$40m.

Editorial: Location Seen as Wrong

Hong Kong HONGKONG STANDARD in English 18 Jul 86 p 6

[Editorial: "Getting Daya Bay Into Perspective"]

[Text] TODAY we devote three pages to some of the more important views presented at Wednesday's Legislative Council debate on the Daya Bay nuclear project. We believe this issue is vital to Hongkong's interests. And we believe people deeply interested in it should be given an opportunity to study them in full.

We also want to make it clear where we, *The Hongkong Standard*, stands on this issue. We are squarely behind China's aim to acquire nuclear technology.

But we do not believe Daya Bay is the right place for it. It is just too close for comfort. Thirty miles may seem an immeasurably long distance to some people. But it is only twice the distance from Tsim Sha Tsui to Taipo. And only an hour's bus ride between those two points.

There is not and cannot be any absolute guarantee of safety, no matter what the experts may say. Simply because the fail-safe operator is non-existent.

And, in the worst possible scenario, there is simply no escape route for the people. How do you evacuate six million people by sea within a couple of hours? The bottom line is we have nowhere to flee to.

Hongkong people are very concerned. They have not got themselves emotionally worked up over it. They are far too level-headed to get caught up in any mass hysteria. Otherwise there would be far more than just that one poster of a winged devil fluttered in the face of legislators on Wednesday.

They are not ignorant about the issues involved. There have been countless essays, couched in layman's language, to explain all the technical aspects of the project. In both English and Chinese. And over the electronic medium as well.

And their concern has been shown in a way never done before. No matter what some people may say to belittle the signature campaign, the million signatures is a clear indication of the groundswell of support for the anti-Daya Bay initiative.

The stress is on anti-Daya Bay. Not anti-nuclear plant. This must be made clear because the Financial Secretary, Mr Piers Jacobs, was way off mark when he talked about the credibility of the government and of Hongkong being at stake if we reneged on this agreement with China.

A few odd bods may like to see the whole deal scrapped. But we do not believe the majority of Hongkong people share this view.

All they and we, *The Hongkong Standard*, are saying to China and to the Hongkong Government is: Rethink the location.

As Shanghai and its environs are further from China's other nuclear project at Qinshan than Hongkong is from Daya Bay, it is not unreasonable to suggest that our people be given the same consideration.

That consideration is safety. Of its people and of the delicate foundation upon which Hongkong, as an international trading and financial centre, is built.

What use will there be for all the energy transmitted here from Daya Bay if people, including potential investors, lose confidence in this place?

When that happens all the agreements signed by Mr Jacobs will not be worth the papers they're written on. And nobody will care a fig about anybody's credibility, least of all the government's.

For the six million people here it is not just a matter of confidence. It is a question of living in the shadow of a nuclear holocaust. Not for a year or two. But for decades — with the technology getting more outdated with every passing year.

But things need not come to such a pass. China can have its nuclear plant. And see its other ambitions fulfilled. We can have the energy. All these without reneging on any agreement. Without sacrificing our credibility.

It is just a matter of relocating the plant. Not as easy as it sounds, maybe. But it can be done if all the people involved in the project, from Mr Deng Xiaoping and Mr Hu Yaobang down to Mr Jack Cater and Mr Jacobs are prepared to face up to the problem squarely. So must the governments of Britain and Hongkong. And of France, too.

There is no question of loss of face. All the people involved in the project will not be held in lesser esteem for taking the concern of Hongkong people into consideration.

The issue is extremely serious. There is much more at stake than just cheaper electricity for Kowloon. It has to do with our whole future. How safe, how confident we can be in this future.

It demands rational discussions. Sober approaches. Sound arguments. It also calls for understanding of the opposing viewpoint. Some of these we got from the Legco debate on Wednesday.

In a word, getting our perspectives right. Willy-nilly, Mr Jacobs has got them wrong. There is no call to renege on the agreement. That agreement can stand. Only the name of "Daya Bay" must be changed.

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CSO: 5150/0156

HONG KONG

PAPERS REPORT ON UK AUTHORITY STUDY ON DAYA SAFETY

Concern Over Flaws

Hong Kong HONGKONG STANDARD in English 28 Jul 86 pp 1, 22

[Article by Sheila Dawes]

[Text] **THE Hongkong Government is privately alarmed by disturbing figures and serious gaps in a British safety study of the Guangdong nuclear power station project, according to *The Observer* newspaper.**

The London newspaper claimed to have obtained confidential documents which revealed that the study carried out by the United Kingdom Atomic Energy Authority (UKAEA) at Harwell failed to reveal risks.

Subsequent correspondence shows that the Hongkong authorities are extremely worried about the safety of the Daya Bay reactors, *The Observer* claims.

As part of its attempt to calm public fears about the reactors' safety, the Hongkong Government commissioned the still unpublished Harwell assessment report from Britain. It was delivered earlier this year.

The newspaper [illegible] that the correspondence which followed showed the Hongkong Government's disquiet and stated that the study was purely theoretical and failed to answer key questions about the reactors' safety.

The study also "puts the risk of a serious nuclear accident at around one in 300." The Government feels that this is not "particularly reassuring."

The Harwell report "misses key environmental factors that would raise these risks even further and assumes that an evacuation of Hongkong would be possible after a serious nuclear accident — although the overcrowded city is almost surrounded by sea", the newspaper reported the Government as saying.

It also "fails to take into account any lessons learned after the Chernobyl disaster and lacks any authentic French design information," said *The Observer* in elaborating the Government's doubts.

The newspaper said Harwell also offered advice on the public presentation of the more unwelcome statistics which has shed revealing light on British practices.

The atomic energy authority showed how figures could be turned into incomprehensible scientific jargon, or simply omitted from the text and buried in tables, *The Observer* alleged.

"A British safety expert shown the UKAEA report, titled *Daya Bay Nuclear Power Station: Accident Analysis Phase One*, said it was of "very little scientific value.

"It simply assumes, without any supporting analysis, that the risk of an accident is similar to that predicted for US and European reactors.

"It then applies a crude analysis to estimate the consequences for Hongkong residents.

"But no mention is made of the uncertainties involved in such calculations which by any standards are enormous. In addition, the figures quoted in the report are said to 'reflect international experience', but this is wrong. They are merely theoretical estimates taken from other studies," he said.

Other criticisms of the atomic authority's work quoted by the newspaper included those made by Hongkong's Director of Electrical and Mechanical Services, Mr Graham Osborne.

He is reported to have said he was "amazed" that the British authorities made no reference to Chernobyl in subsequent correspondence with the Hongkong authorities.

Two major assumptions of the report had been altered by the Chernobyl disaster.

First, the report assumed that in the event of a reactor accident, a release of radioactivity would be limited to 10 hours. At Chernobyl it lasted four days.

The study also assumed an accident would occur in "constant weather".

In other words, the wind direction and speed would not change during the accident, or rainfall commence.

But at Chernobyl, radioactivity was spread not just downwind, but in all directions around the reactor for hundreds of miles.

Lamb sales were banned as far away as Britain and Switzerland and milk contaminated.

The Harwell report said a serious accident could have "significant consequences for the colony", but its probability was only one in 20,000 per reactor, *The Observer* said.

It claimed that Mr Osborne, on February 7 this year, told the Hongkong Secretary for Economic Services: "I rather doubt if the layman would find it particularly reassuring bearing in mind there are two reactors and the life of the station is expected to be 30 years, the chance of a severe accident during the lifetime of the station becomes only one in 333."

The paper said that later Harwell agreed that adding "external hazards" such as plane crashes and tornadoes would at least further halve these odds.

Harwell also agreed its reassuring radiation dose figures after an accident asdsumed "fairly large numbers of people" would be evacuated, *The Observer* said.

It quotes Mr Osborne's reactions that: "Evacuation is not a viable option for Hongkong."

He added: "The possibility, however remote, that there could be over 1,000 early deaths arising from an accident does not inspire confidence, especially as the statement is silent on ...delayed fatal cancer...I must confess the overall risks are higher than I expected."

The paper reported that Mr Osborne said in a confidential memo dated May 15, that Harwell's warning worried him, and quotes him as saying: "Take it that we have still not had a reply to our telex to London asking how the price reduction was achieved.

"We have in the past two weeks made a lot of reassuring statements...but as far as I am aware, nobody in the Government has seen in writing the facts on which these statements are based."

The UKAEA yesterday refused to comment about the report, *The Observer* said.

[Boxed items, p 1]

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> **THE possibility, however remote, that there could be over 1,000 early deaths arising from an accident does not inspire confidence, especially as the statement is silent on ...delayed fatal cancer...I must confess the overall risks are higher than I expected...**
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> **...I rather doubt if the layman would find it particularly reassuring (that) the chance of a severe accident during the lifetime of the (Daya Bay nuclear) station becomes only one in 333.**
>
> LONDON'S *Observer* newspaper quoting Hongkong's Director of Electrical and Mechanical Services Graham Osborne to the UK atomic authority's report on Daya Bay.

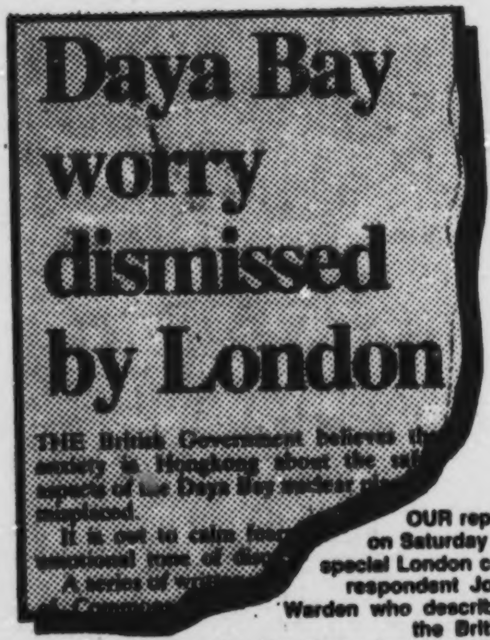
DAYASPEAK

LONDON: According to *The Observer*, the Hongkong Government sought help from the United Kingdom Atomic Energy Authority in the “presentation” of the Harwell report.

The reply was a list of proposed changes to remarks which might be presented “out of context”, the paper alleges.

The paper said that one, for example read: “Replace ‘about a third of severe accidents would result in some cases of fatal cancer’ by ‘the conditional probability of the occurrence of one or more cases of fatal cancer, given a (very unlikely) severe accident as defined in this study, is about 0.34’.”

The paper said that Harwell added: “If it is considered the above statements as amended are still open to misconstruction ...they may, of course be deleted entirely without loss of information (which is all in the tables and figures).”



Daya Bay worry dismissed by London

THE British Government believes th
anxiety in Hongkong about the saf
aspects of the Daya Bay nuclear pl
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It is out to calm fear
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A series of [illegible]
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OUR report on Saturday by special London correspondent John Warden who described the British Government dismissing Hongkong fears over the nuclear project as ‘misplaced’.

Hong Kong Official's Comment

Hong Kong HONGKONG STANDARD in English 30 Jul 86 p 1

[Article by Katherine Saltzstein]

[Text] A GOVERNMENT official yesterday asked for a more comprehensive study of Daya Bay by the United Kingdom Atomic Energy Authority (UKAEA), while a member of the Legislative Council called for an independent third party to look at the proposed nuclear power plant.

Mr John Yaxley, Secretary for Economic Services, said in a press statement that the UKAEA at Harwell, commissioned by the Hongkong Government to study the plant, should take a closer look at the specific characteristics of Daya Bay.

The UKAEA also authored the feasibility study of the plant undertaken five years ago and released in Hongkong this week.

Mr Yaxley criticised the authority's most recent report, saying that the preliminary accident assessment was based on safety studies of reactors elsewhere in the world, and did not consider all features of the proposed Daya Bay plant.

He suggested that the study encompass specific features of pressurised water reactors — the type to be built at Daya Bay. Also, other factors, including meteorology, topography, and demography of the area should be looked at, he said.

Mr Yaxley returned recently after meeting with UKAEA officials who agreed to expand stage II of the accident assessment study to make it more relevant to the Daya Bay plant and site.

A team of officials will soon travel to Harwell to consult UKAEA officials on the details. The final report will be made public, he said.

UKAEA recently issued a preliminary report on contingency planning for the plant.

Meanwhile, Legislative Councillor, Mr Poon Chi-fai, said he would propose at a Legco in-house meeting that an independent investigation "by a neutral third party" be conducted.

He criticised the joint venture company working on the project for not releasing more information.

Report Deemed Outdated

Hong Kong SOUTH CHINA MORNING POST in English 1 Aug 86 pp 1, 2

[Article by Albert Chan]

[Excerpt] A BRITISH experts' report on how the Government should devise a strategy to promote nuclear energy in Hongkong has become outdated even before any of its recommendations are implemented.

The report, entitled *A Public Education Strategy*, was completed in October last year as part of a $2.1 million consultancy package commissioned by the Hongkong Government.

Probably the most ironic statement in the report – in the light of recent events – was the concluding paragraph in the summary which said: "To date, there has been no significant hostility to the project."

The report also said Hongkong newspapers "seem to be supportive of the authorities and have taken a positive approach to the Daya Bay project, stressing its benefits to Hongkong" while most people in Hongkong "have a traditional respect for authority."

Adds the report: "The British tend to disbelieve and mistrust 'official' statements and be rather contemptuous of those in authority. The Chinese tradition tends to be the opposite."

The experts therefore came to the conclusion that promoting nuclear energy and the Daya Bay project to the people of Hongkong would not be a difficult task.

The experts said the Government should tell the public that the Daya Bay nuclear project was a *fait accompli* and that it was "symbolic" of the political settlement between Britain and China on the 1997 problem.

It said "most sections of the local community can identify some benefit in the project."

The "benefit" seen by the Hongkong Government would be that it "cements the political agreement."

It said: "The agreement to proceed with the Daya Bay project as a joint venture can be seen as consistent with this arrangement and to be supportive and even symbolic of it."

"Indeed, it is difficult to identify a constituency in the Hongkong political spectrum in which hostility to the project could take root."

Even before the Government starts to implement any of the recommendations – which include promotional documentaries on television and nuclear lessons in schools – the report has become outdated because of the Chernobyl accident.

After the Soviet disaster and a huge local anti-nuclear campaign in recent months, the Government has conceded that the situation has changed substantially.

The Government is therefore undertaking a fresh review of the recommendations made by the British experts, and has no idea when such a public education program will be implemented.

A prophetic statement from the report said: "It is important to make a start on the program as soon as possible. Although one would not reasonably expect the appearance of a virulent anti-nuclear movement in Hongkong . . . it would be unwise to rule out that possibility.

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CSO: 5150/0158

HONG KONG

PAPERS REPORT ON DAYA BAY FEASIBILITY REPORT

POST Reviews Content

Hong Kong SOUTH CHINA SUNDAY MORNING POST in English 27 Jul 86 pp 1, 2

[Article by Ann Quon]

[Text]

THE long-awaited feasibility report on the Daya Bay nuclear plant, due to be released to Legislative Councillors tomorrow, contains little information on safety and no reference to contingency measures in the event of a major nuclear accident.

The report, which has been seen by the *Sunday Morning Post,* is bound to upset those seeking assurances about the plant's safety aspects.

Throughout the five-volume report, of which only three volumes will be made available to councillors, there are few mentions of safety.

It fails to address issues such as safety procedures to follow in the event of an accident and lacks any contingency plan or evacuation procedure.

Nor does it make specific recommendations on any of these issues, which have become the cornerstone of the current nuclear debate.

Instead, safety for the plant is simply cited as the responsibility of the joint venture company in charge of the project, the Guangdong Nuclear Power Joint Venture Company and the Chinese Government.

Because Daya Bay had yet to be chosen as the site of the plant when the study was completed in 1980, reference is made throughout to the more general term, the Guangdong nuclear power station.

On safety, the report says: "The safety standards adopted will be those appropriate to the Guangdong nuclear power station.

"These will include existing regulations related to Chinese fossil-fuelled power stations, the Environmental Protection Law (draft) and the radiation protection regulations of the People's Republic of China.

"In addition, safety standards for the design, construction and operation of the nuclear power plant in Guangdong will be formulated in the light of relevant experience in other countries."

The report adds that the joint utility is to take charge of the plant's safety under the "guidance and inspection of the relevant authorities of the People's Republic of China".

Despite the failure to be specific about the course of its safety program, the report does acknowledge that "because of the participation of China Light and Power and the Guangdong Power Company in the project, it is important to give sufficient consideration to the concerns about nuclear power plant safety expressed in Hongkong and Guangdong."

However, sources last night indicated that, because the report was completed before the design of the plant was decided upon, it would have been difficult to draft contingency plans.

The report, which is otherwise highly technical, is likely to go over the heads of most legislative councillors because of the detail paid to statistical and geological information.

Nevertheless, its release comes at a time when councillors have been pressing for more information about Daya Bay in the face of mounting opposition to the plant, which is to be built only 50 kilometres from Hongkong.

In what is seen as an attempt to allay fears about the safety and commercial viability of the plant, pressure was applied by the Government on the Hongkong Nuclear Investment Company, the Hongkong partner in the joint venture to release the study.

The report should be ready for distribution to councillors tomorrow. However, it is expected to fall well short of expectations.

This is because, not only is information relating to safety far from detailed, but a separate and vital report dealing with the economic viability of the plant is being withheld.

What councillors will get instead, is a series of reports consisting largely of charts, graphs and maps as well as detailed technical data.

Another factor that will disappoint councillors is that the report is based on studies completed six years ago. Completed in December 1980, it offers options and no hard and fast recommendations in areas like equipment or station design.

The three studies to be handed over to councillors will cover system designs, equipment study and site selection.

The last study has been broken into three volumes and includes two separate site selection studies as well as an appendix. The initial site selection study was completed in 1980, but replaced by a second study carried out two years later.

This was because two of the sites around Daya Bey, at Thun Yang and Pong Shan, which were seen as feasible during the earlier study, had been shelved.

The reasons given had nothing to do with geological considerations, but because "both Thun Yang and Pong Shan were at variance with the development of Shenzhen and national construction."

There are also indications in the report that Beijing felt the "seismic and geological work initially carried out was insufficient in detail and scope".

The report also reveals that in January 1981 the Joint Selection Committee of the Guangdong Power Company and China Light and Power looked into the feasibility of building a plant at Mirs Bay near Hongkong.

It found that Mirs Bay was not only suitable, but situated in a stable geological location and considered safe. However, the proposal was rejected by China Light and Power because of concern that it was too close to Hongkong.

Another site at Xia Sha, although suitable, was also turned down because it faced Peng Chau Island.

As a result, it concluded that Daya Bay (or Da Keng as it is called in the report) was the "most suitable, Ling Jiao Shi was the next most suitable, while there were problems in Xia Sha."

The sites at Ling Ao, and Chang Xui Jiao were rejected because of their proximity to geological fault lines.

The report, which has been vetted by Chinese authorities, will have some parts censured as state secrets with a note in the front of each volume explaining why certain parts have been excluded.

What councillors won't get to see include maps, diagrams and charts.

These will be blacked out with the wording "PRC state secret. No authority to reproduce" slashed across the page.

In agreeing to release the report, Beijing has indicated that it does not wish to make public parts of the report which contain material that is considered either sensitive commercially or strategically important to the country.

It is believed the latter covers details of mineral and metallurgical reserves in southern Guangdong.

Censured completely will be what are considered the two most controversial studies in the feasibility study.

These include the summary and economic reports, which contain all the commercial information relevant to Daya Bay such as the projected price of nuclear fuel as opposed to conventional fuel costs and equipment cost breakdowns.

Without these reports, it is unlikely that an assessment can be made on the commercial viability of the project at a time when power produced by conventional means is looking increasingly attractive due to low fuel costs, although projections are that they will rise by the time the plant comes on stream in 1992.

The safety assessment of Daya Bay is contained in the 67-page volume on equipment safety.

Also included are assessments of different types of reactors, and turbine generators as well as quality assurance procedures, decommissioning of the plant and the treatment of effluent.

On the crucial issue of the type of reactor to be used at Daya Bay, the report says that the final choice will be made "on economic, political or contractual grounds and not technical grounds."

One of the most technical reports in the series is on system design. The report examines unit and station capacity for generating power as well as the types of transmission networks for connection of the station and the principles of system operations and despatch.

The feasibility study was commissioned by the Guangdong Nuclear Power Joint Venture Company, which is owned 75 per cent by the Guangdong Nuclear Investment Company and 25 per cent by the Hongkong Nuclear Investment Company, a subsidiary of Hongkong's largest power utility, China Light and Power.

When contacted by the *Sunday Morning Post* yesterday, the Secretary for Economic Services, Mr John Yaxley, declined to comment on the contents of the report.

However, he did confirm that it would be released to Legislative Councillors tomorrow and that two of the five volumes would be withheld.

"Things like geographical features don't change, but the commercial aspects do. I have no doubt that the two companies and the joint venture company are looking at revised financial projections,"he said.

A decision has yet to be made on whether the feasibility study will be made available to the public, although it is likely to be released to the news media once councillors have had a chance to read through each of the telephone directory-size reports.

Study Called Useless

Hong Kong SOUTH CHINA MORNING POST in English 28 Jul 86 pp 1, 2

[Article by Albert Chan]

[Text] TOP officials involved in the Daya Bay nuclear project said yesterday that parts of the feasibility report to be released this week were "useless," "irrelevant" and "superficial."

The public should press the Government to release the Lazard Brothers report, a merchant banking study on the controversial project, they told the *South China Morning Post.*

The officials asked not to be named but include directors and executives of the Guangdong Nuclear Power Joint Venture Co (JVC) and engineers from the mainland and the China Light and Power Co.

They said the five-part feasibility study had been done six years ago and much of the information was out of date.

One example was the equipment study section which examined the various types of nuclear reactors available.

"In 1979 when the report was done, Framatome emerged as the best choice. Westinghouse has since produced a more superior design," said one engineer.

Another official described the equipment study as "superficial" because it contained information from brochures supplied by the various equipment suppliers.

At the time of the report, it had not been decided which reactor manufacturer would be chosen and potential vendors would have been reluctant to release too many technical specifications, he said.

The officials agreed that by keeping confidential the vital part of the report dealing with the economics of Daya Bay, the Government would leave a significant vacuum in the public's understanding of the project.

But even the economic study was out of date, they said.

Reliable sources said the JVC, and China Light in particular, had agreed to release the report only after pressure from the Hongkong Government and persuasion by Financial Secretary Piers Jacobs.

However, one JVC director said: "What could really shed light on the project is the Lazard Brothers report which deals with the financial and economics aspects.

"The public should press the Government to release this rather than pursuing our outdated feasibility study."

Neither China Light nor the Chinese authorities were allowed to see the Lazard Brothers report, which was commissioned by the Government several years ago to examine the economic justification of Daya Bay.

Legislative Councillor Miss Maria Tam said yesterday her understanding was that the Lazard Brothers report was written with confidential information supplied by China Light and that the Government could not release it without the power company's approval.

She said she would clear the matter with China Light and the Government before pressing for the report's disclosure.

As for the feasibility study, two of its five parts are to be kept from the Legislative Councillors and public. The first is a summary of the study and the other examines economic aspects.

As the *Post* reported last week, the Chinese authorities have further censored the public version by withholding geological and metallurgical information on southern Guangdong, including maps and photographs.

It has now been learned that all the figures and dollar signs will also be blacked out.

The three parts to be made public this week are the system design report, the equipment study report and the site selection report.

Sources said the system design report, which contains information about power systems and forecasts for Hongkong and Guangdong province, would be edited before release because some parts were "economically sensitive."

The site selection report comprises three volumes, each the size of a telephone directory.

The first two volumes are 1980 and 1982 site selection studies. The third contains geological details and will be totally withheld.

This leaves the equipment study report as the only one which will be fully disclosed.

China Light and Power Co has been given the tedious job of making 50 photocopied sets of the study with censored material deleted.

The 50 sets, which literally need a lorry and several workmen to deliver, will reach Umelco today or tomorrow.

Expense of Shutdown

Hong Kong SOUTH CHINA MORNING POST in English 28 Jul 86 p 1

[Text] ABOUT $2.7 billion will be needed for the decommissioning of the Daya Bay nuclear plant, which is about 10 per cent of the total cost of building it.

This estimated figure is contained in part three of the feasibility report which deals with equipment study for the nuclear plant.

The report recommended that a special fund be set up when the plant comes into operation and that a certain amount be assigned each year so that when the plant needs to be decommissioned, the huge amount would be ready.

The annual amount would be calculated as the annual operational cost for the plant.

As for the exact amount needed for decommissioning, the report only said: "For the purpose of planning the project, it may be assumed that cost of decommissioning will be 10 per cent of the construction of the plant."

The cost of the plant at today's estimate is around HK$27 billion inclusive of interest which means the cost for decommissioning should be about HK$2.7 billion.

With the expected life of the Daya Bay station put at 30 years, the joint venture company would have to put up about $90 million per year.

The report said the plant may have to be decommissioned if "a major accident" rendered it uneconomic to repair.

But it did not say where the money would come from if that happened after only a few years of operation.

The $2.7 billion would be used to decommission the plant in three stages, said the report.

The first would involve the discharge of fuel from the reactor and other procedures and would take up to three years to complete.

This would be done once the plant was totally shut down and measures taken to ensure contamination was reduced.

The second stage would take up to 10 years and involve reducing the operational size of the plant to a minimum.

The third and final stage could take as long as 100 years to complete because it involved the delicate problem of reducing the effectiveness of highly radioactive substances because of their long half-life.

But the report noted that "experience in decommissioning of pressurised water reactors is limited" because few have reached the end of their working lives.

Quake Damage Unlikely

Hong Kong SOUTH CHINA MORNING POST in English 29 Jul 86 p 5

[Text]

THE site of the proposed Daya Bay Nuclear Power Plant is in China's earthquake zone, but earthquakes "are infrequent and moderate," according to a 1980 feasibility study.

The comprehensive report, which includes several diagrams and graphs, was released to Umelco and the press yesterday.

In a chapter on site selection, the authors say they narrowed the number of sites to three, none of which was selected.

Two of the sites discussed in detail, Dong Shan and Hu Tou Jiao, are near Daya Bay.

At least six graphs in the report, including one on the distribution of earthquake epicentres in Guangdong province are blank with the words "PRC state secret; no authority to reproduce." Daya Bay is within Guangdong province.

The first earthquake recorded in the area occurred in 1067, the report says. There have been a total of 11 earthquakes since then, each with a magnitude of six and above on the Richter scale.

The largest earthquake recorded in the coastal region was in 1604, more than 550 kilometres away from the three sites.

The report states that earthquake activity in this region is "moderately strong" yet "comparatively less than in a medium level activity zone."

The report states that the inhabitants in the Daya Bay area are engaged in agriculture and there are no dairy or chicken farms.

Therefore, the report concludes: "It is improbable that contamination through the biological cycle will occur and the subsequent absorption into human bodies through the food cycle."

The report also says that Daya Bay is a breeding ground for fish and oysters. There are two agriculture and three fishery communes and two national pearl breeding grounds.

The study says the proposed nuclear power plant will hardly affect the abundant marine life in Daya Bay.

"It is rich in marine life, and the fish breed and grow in Daya Bay," the study says. "The shallow coastline along Daya Bay is one of the best shrimp spawning grounds."

There is also an abundance of shell fish along the shore including pearl clams, jade clams, abalone and snails.

But, the authors say: "It is estimated that hot water released from the power station will affect only a limited area of 3 to 3.5 kilometres and thus have limited effect on the entire bay. The waste water to the sea will have little environmental impact."

On-Site Waste Storage

Hong Kong HONGKONG STANDARD in English 29 Jul 86 p 5

[Text] STORAGE of highly-radioactive nuclear waste from the Daya Bay nuclear power plant was recommended to be located on site, according to the 1980 Equipment Study Report of the Daya Bay Feasibility Study.

The report is among three volumes of the feasibility study made public yesterday.

The report stated there was no existing (nuclear) disposal site in the People's Republic of China and a site had yet to be determined. It recommended the construction of a storage building on site at Daya Bay to accommodate up to 10 years' waste.

The storage area must provide sufficient space for the emergency discharge ot the entire reactor core, the report added.

The two 900 megawatt reactors to be built at Daya Bay would normally produce 51 tonnes of spent fuel each year which would be composed of 0.9 percent Uranium 235 and approximately .14 kilograms of Plutonium.

Plutonium and Uranium 235 are recoverable through reprocessing and, the report says, this will form part of the overall Chinese national nuclear plan which at the time of the report was not yet finalised.

Solid nuclear waste from the plant would fall into two categories: namely low-level and medium-level waste.

Hong Kong Scientist's Comment

Hong Kong HONGKONG STANDARD in English 2 Aug 86 p 5

[Text] A LEADING local scientist said yesterday that the safety standards revealed in the feasibility report of the Daya Bay nuclear project are on a par with international requirements.

The acting director of the Hong Kong University Radioisotope Unit, Dr Man-Yin Wong Tso, told reporters after a seminar on nuclear power that she believes the study is reliable.

The study, which was conducted six years ago, takes 0.15 rem as the dose of radiation that a person can endure within a 30-km range of the power station under emergency situation.

Dr Tso noted that the permissible level set by the International Commission of Radiological Protection, a sister set-up of the International Atomic Energy Agency based in Vienna, is 25 rems.

[illegible] people might have confused the figure with the US federal regulation on the permissible level under ordinary circumstances, which is 0.0025 rem.

The permissible level for building a nuclear station is different from the normal day-to-day situation, Dr Tso said.

The convenor of the anti-nuclear coalition, the Rev Fung Chi-wood, had earlier criticised the safety standard as being four times lower than that currently in use in the US.

The report also assumes that, if the worst comes to the worst, the Daya Bay installation will lead to 1,000 to 10,000 curies of radioactive contamination.

Dr Tso pointed out that even in the 1979 Three Mile Island case — the worst accident that has ever happened to a pressurised water reactor — the radiation level only reached 15 curies.

Meanwhile, the Chinese Nuclear Power Industry Minister, Mr Jiang Xinxiong, said China would follow the guideline of "safety and quality first".

The minister called for more safety regulations and said China would introduce comprehensive quality control systems.

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CSO: 5150/0157

HONG KONG

GOVERNOR RULES OUT REFERENDUM ON DAYA BAY

Hong Kong SOUTH CHINA MORNING POST in English 4 Aug 86 p 1

[Text]

THE Acting Governor, Sir David Akers-Jones, yesterday ruled out holding a referendum on whether the nuclear plant planned for Daya Bay in China should be built.

"I don't think you can decide things like this by referendum. It's not a satisfactory way of dealing with such a complicated subject, really," he said.

He stressed that since the plant would not be built in Hongkong, it was not for Hongkong people to decide whether it should be built.

The idea of a referendum was mooted by some Legislative Councillors recently.

Sir David said two delegations of Legislative Council members had just gone abroad on a fact-finding mission and it would be inappropriate to jump to any conclusion on the subject before they return.

He disagreed with a suggestion that the delegations would only collect positive data on nuclear energy, saying that the members would visit Austria where the anti-nuclear sentiment was high.

Sir David said he believed the councillors would be able to complete a report before next month when the contracts for the Daya Bay plant were scheduled to be signed.

● Sir David was also asked about Legco members' suggestions that the number of Officials, which was reduced after indirect elections were introduced last year, should be increased.

He said the Government was aware that during the last session Official members on the council, who had to take questions covering a number of policy areas, were not specifically versed in answering supplementary questions.

Sir David said the Government would gauge the views of the Unofficials before deciding whether more Officials should sit on the council.

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CSO: 5150/0160

HONG KONG

PAPERS REPORT PRC DECISION ON DAYA BAY CONSTRUCTION

Venture To Proceed

Hong Kong HONGKONG STANDARD in English 29 Jul 86 pp 1, 24

[Article by David Wong]

[Text]

CHINA has decided to go ahead with its Daya Bay nuclear project, despite local alarm and protests, and will sign the remaining contracts a month ahead of schedule.

The decision is reported in the latest issue of *Outlook Weekly*, an influential publication reflecting the views of Chinese leaders. Quoting no sources, the report says China will proceed with the project, regardless of protests against it.

The decision was made recently in spite of mounting pressure from the people of Hongkong asking that the controversial plant be relocated away from the territory, according to diplomatic sources.

As a result, Umelco's fact-finding missions to Europe and the United States will have only one instead of six weeks to complete their reports, sources said.

The *Standard* understands that the Chinese government recently held a top-level meeting in Beijing to appraise the project and re-examine China's position on the matter. It has developed into a highly sensitive political issue.

The meeting was chaired by Vice-Premier, Mr Li Peng, and attended by top officials involved in the multi-billion dollar plant.

The date and venue of the meeting were kept top-secret, but the *Standard* learns it was held about two weeks ago.

Among those present were government ministers, including the Minister of Nuclear Industry, officials of the Guangdong Nuclear Power Joint Venture Company (JVC) and officials from other government departments concerned, a diplomatic source said.

It is understood that a senior official of the local *Xinhua* news agency was also present, but his identity is not yet known.

After the meeting, Mr Li met with the British and French ambassadors in Beijing to inform them of China's decision.

Britain and France are both major suppliers of key components for the project, including the reactors and other elements of the infrastructure.

This latest development means that China is taking a firm line on its original plan to build the nuclear plant at Daya Bay, and is not bowing to pressure from local anti-nuclear plant groups who want the plant relocated.

The meeting also gave the Guangdong Joint Venture Company the green light to proceed with their original plans without delay, sources said.

Contracts to this end will be signed in September. The signing date was originally to have been postponed. Construction has already fallen far behind schedule because of the unduly lengthy negotiations.

The *Standard* understands that if the project were scrapped, termination fees and other compensation could cost up to $390 million (US$50 million). This is not including the $1,014 million (US$130 million) already spent up to the end of June this year.

Despite the firm stand taken by the Chinese government in the matter, it was agreed at the Beijing meeting that there was an immediate need to help the Hongkong public understand the implications of the nuclear plant better and allay needless fears.

This explains why China is now willing to permit local legislators to read the confidential feasibility study made on the project.

It is understood that both the British and French governments were anxious whether China would go ahead with the project in view of local opposition.

After the British ambassador in Beijing was told of the decision, London informed the Hongkong Government.

Sources said that when Chief Secretary, Sir David Akers-Jones, made a relatively strong statement on July 17 declaring that Hongkong was unable to withdraw from the project, it was clear that he had already been informed of China's latest position.

It is understood that the Chinese government now wishes to give Hongkong access to as much information about the project as possible, except data relating to sensitive commercial secrets.

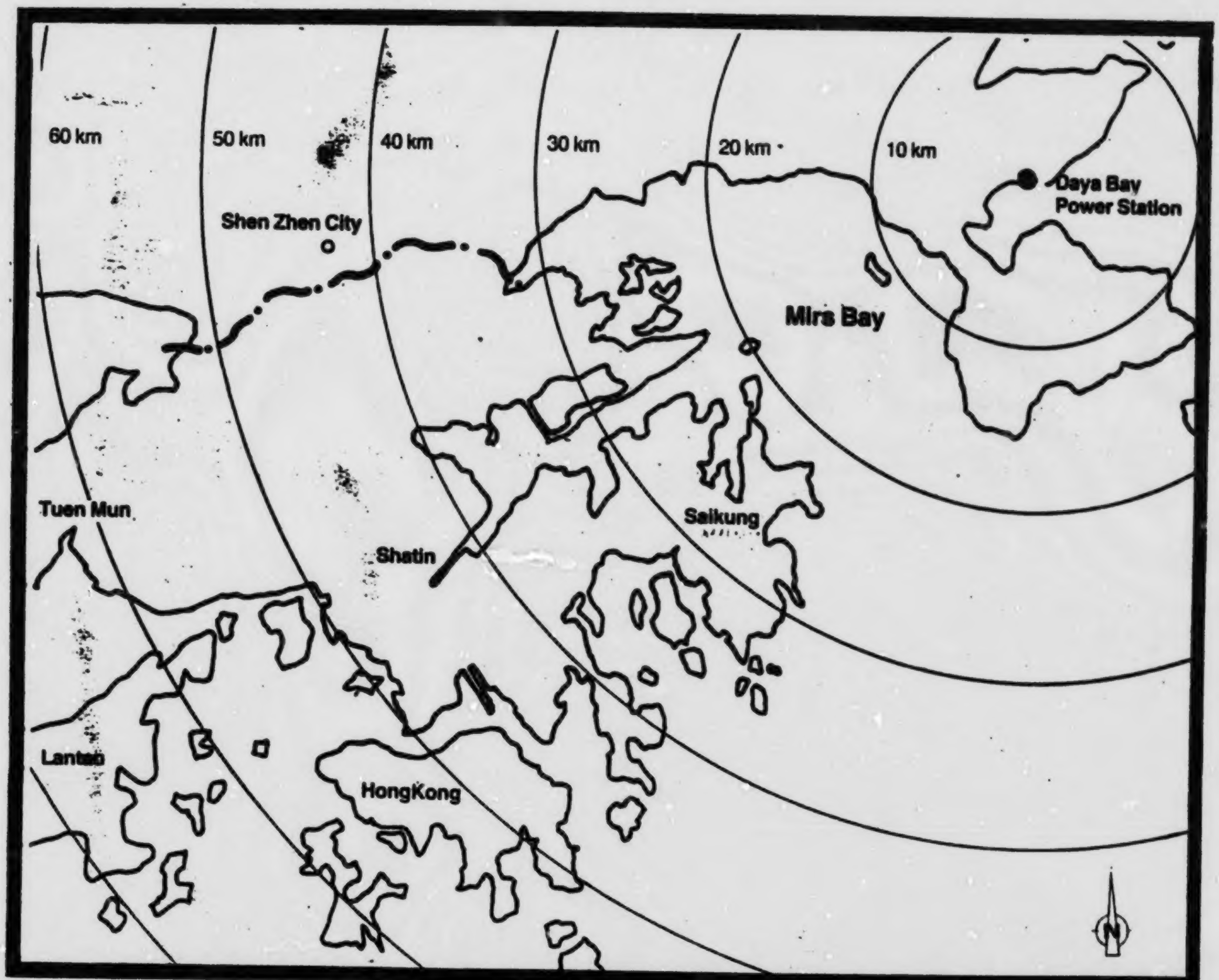
The government was earlier strict about keeping the reports to itself.

It has also stepped up its propaganda to give the public a better understanding of nuclear energy and its importance, and how safe it is with the advanced technology now available.

The China News Service and leftwing newspapers here have recently interviewed nuclear scientists, local and foreign, and given extensive coverage to the "positive" aspects of nuclear technology.

"One of the first questions to ask the public is whether it can tell the difference between a nuclear bomb and a nuclear electricity plant?" a source commented.

"Most people don't realise the basic difference. Their instant fears arise chiefly out of ignorance," he added.


60 km
50 km
40 km
30 km
20 km
10 km
Daya Bay
Power Station
Shen Zhen City
Mirs Bay
Tuen Mun
Shatin
Saikung
Lantau
HongKong
N

MAP showing the location of the Daya Bay plant in relation to the territory.

No Role for Hong Kong

Hong Kong SOUTH CHINA MORNING POST in English 30 Jul 86 p 10

[Text] THERE is little likelihood that Hongkong will have a role in the supervision of the nuclear plant at Daya Bay which is scheduled to be in operation by 1993.

There has been no official indication that China will accede to a request from certain quarters in the territory that some Hongkong specialists should join a supervisory body to be set up to look into safety aspects of the plant, 50 km from Hongkong Island.

As far as is known, China has sidestepped the proposal, stressing instead the meticulous planning and comprehensive system of supervision devised by the parties involved – France and China.

And over the past few days the signals from China have been to the effect that construction of the plant will definitely go ahead.

These signals and veiled messages have appeared in the leftwing press and through sources close to the Chinese authorities. The latest edition of the prestigious magazine *Outlook* categorically states that it would be a total fallacy to suggest that the Chinese authorities might reconsider the project at Dayr Bay.

One authoritative source also said that there would be no change in the plans for Daya Bay unless there were "compelling reasons."

So far, few Hongkong people if any have been able to argue convincingly that the plant would not be safe and would indeed pose a serious threat to the territory. On the contrary, China has repeatedly stressed the safety factors in the design and administration of the nuclear plant, supporting the assurances with statistics on the safety of water-pressurised plants.

These statements have come as the campaign by local people opposed to the concept has culminated in a million-signature campaign and the decision to go to Beijing to present their views.

The campaign is viewed by many as having a significance beyond the current controversy. Some believe it could be the sign of a new element in the fledgling political development of Hongkong.

A source close to China felt that, now the plant was definitely to be built, the task ahead was to acquaint the Hongkong people with all its aspects. It was with this in mind, said the source, that China gave approval to the publication of a report on the plant that shed much new light on the technical details and safety aspects of the venture.

The report (aside for the section dealing with financial matters) should do much to eliminate the fears and anxieties of local people but it needed to be fully digested and explained in layman's terms, the source said.

However, it remained to be seen whether China would agree to the suggestion that qualified and respected Hongkong specialists be included in the monitoring and supervision of the plant at Daya Bay.

Present arrangements, as disclosed by reliable sources, called for the management of the plant to be headed by the French and only after five years of operation would the Chinese take over the leading role, with the French acting as subordinates.

Such arrangements are considered to be adequate to ensure the safe running of the plant. This being the case, it is reasoned, there is little need for third parties to be involved.

Other sources note that the China Light and Power Company, which is also involved in the plant, may have its engineers there. Thus, to a certain extent, it may be said that Hongkong is involved, if only in a very small way.

As for the possibility of contamination in Hongkong should an accident occur, sources pointed out that China was planning another nuclear power plant in Qinshan, about 50 km from the centre of the vast municipality of Shanghai.

When the blueprint for the Qinshan plant was first made known, there were similar fears and apprehensions by the 10 million people of Shanghai. A series of meetings was held at which scientists, environmentalists and other members of the community discussed the pros and cons of the project. After thorough debate, the objections, due largely to ignorance of the true implications of the plant, were withdrawn.

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CSO: 5150/0164

HONG KONG

TOUR OF DAYA FACTFINDING DELEGATION REPORTED

Purpose of Tour

Hong Kong SOUTH CHINA MORNING POST in English 2 Aug 86 p 1

[Article by Albert Chan]

[Text]

THE Legislative Council's overseas nuclear fact-finding delegations will make no judgments on whether the Daya Bay nuclear project should be built or not.

On the eve of their departure to Europe, America and Japan, the leader of one of the groups, Mr Allen Lee, said: "I don't think we have the expertise to make a judgment. I don't think it is up to us to convince the Hongkong people whether Daya Bay is safe or not."

Delegates participating in the tour, which will cost taxpayers $200,000, will compile a report after they return.

The leader of the other group, Legco member Miss Maria Tam, added: "Our mission is to seek expert assessment of the information put to us, to verify the facts and report to the Legislative Council and the people of Hongkong."

She said the purpose of the trips was to:

- Assess the operating and maintenance requirements in plants similar to the Daya Bay project and the risks associated with such plants.
- Find out what contingency plans are necessary for densely populated areas 50 km away from nuclear stations.
- Obtain information from the International Atomic Energy Commission and other recognised authorities on the standards and requirements for operating a nuclear station and what advice they could offer on the monitoring of radiation.

Miss Tam said the group going to Europe also wanted to find out what kind of training Chinese engineers will receive and how China will comply with international safety standards.

The delagation will be armed with 200 questions supplied by a wide spectrum of the public including pressure groups, individuals, anti-nuclear lobbyists, nuclear power experts and officials involved with the project.

Miss Tam will leave for Europe tonight with a group of five, while Mr Lee's group of five leaves for a six-day trip to the United States tomorrow.

The United States delegation will round off their visit by spending three days in Tokyo, and will be joined by several members of the European group plus two other Unofficials from Hongkong.

Mr Lee stressed that Japan was important because it was the only country that has experienced a nuclear attack and still launched a nuclear energy program.

"We would try to find out why they have made such decisions at the government level," he said.

On criticisms that the visit will be dominated by meetings with pro-nuclear officials from the nuclear industry, Miss Tam argued that she hoped a trip to pro-nuclear France will be balanced by a trip to Austria.

"What we will see in France may be pro-nuclear but since Austria, as a matter of policy, is against nuclear plants, we hope what we're going to see there will not only be neutral but also give us the other side of the story," Miss Tam said.

Mr Lee said the United States delegation will meet a lobbying group based near the Three Mile Island nuclear reactor which will most likely be anti-nuclear.

Visit to Three-Mile Island

Hong Kong SOUTH CHINA SUNDAY MORNING POST in English 3 Aug 86 p 3

[Article by Ann Quon]

[Text]

RESIDENTS living near the Three Mile Island nuclear power plant have told a legislative councillor that they are horrified about the decision to build a nuclear plant near Hongkong.

"They were shocked that Daya Bay is going to be built so close to a population of over five million," said Mr Szeto Wah of his visit to Harrisburg, Pennsylvania last week.

Harrisburg is less than 25 km from Three Mile Island, the scene of the worst nuclear accident in the history of the United States nuclear program.

During the accident, which occurred in March 1979, the uranium core of the reactor severely overheated and a quantity of radioactive material was released into the atmosphere, forcing the evacuation of those in the immediate vicinity of the plant. Increased levels of radiation were reported in the area both during and after the incident and the cause was blamed on human and mechanical error.

Mr Szeto is presently on a month-long tour of the United States arranged by the American Federation of Teachers. Because of increased concern in Hongkong over the Daya Bay nuclear reactor, which is to be built only 50 km from downtown Hongkong, Mr Szeto has included in his trip visits to various nuclear installations.

According to Mr Szeto, after the accident at Three Mile Island, fears about radiation and the possibility of another accident forced many residents to move out of Harrisburg, and real estate values, which plunged because of the exodus, have yet to recover.

Mr Szeto visited the plant last week because, like the proposed Daya Bay plant, it uses pressurised water reactors.

However only one of the two reactors is fully operational. The second reactor was shut down permanently after the accident.

Although Mr Szeto is opposed to nuclear generated power, he says his nuclear fact-finding mission is useful and that the authorities have been helpful in providing him with information.

"They have been completely open and try to provide as much information as they can to the public in the form of pamphlets. They also emphasise the dangers involved and try to impress on the public ways they can protect themselves in the event of a radiation leak or a full-scale accident," he said.

This contrasts sharply with the situation in Hongkong, he said, where authorities are only beginning to launch a campaign to educate the public about nuclear energy.

He said that when his Legislative Council colleagues arrive at Three Mile Island next week as part of their own fact-finding tour, they are likely to find that the plant has become a nuclear tourist spot.

"They will get to see videos and have a chance to buy T-shirts, along with the other tourists that come here by the busload," he said.

Like him, they will be taken on a tour of the plant and will be given a small box which detects any change in radiation levels as well as a pair of earplugs to block out the noise of the large turbines that power the plant.

On safety, he says the authorities cannot guarantee that the plant is fail-safe. "They acknowledge that they have taken all the safety precautions they possibly can, but can't guarantee against another accident."

Tomorrow, Mr Szeto plans to visit the Shoreham Nuclear Power Station near Long Island which was forced to stop operating as a result of massive opposition from local residents.

He returns to Hongkong on August 21 and is undecided about what he will do with his findings.

Meanwhile, the second of two delegations from the Legislative Council leaves today for its highly criticised nuclear fact-finding mission.

Led by Executive Councillor Allen Lee, the delegation includes Mrs Pauline Ng, Dr Chiu Hin-Kwong, Mr Ho Sai-chu and Dr Daniel Tse.

First stop on their itinerary will be Washington, where they are booked to stay at the Watergate Hotel. With single room rates at $858 per night, it is among the most expensive hotels on the trip, which was initially estimated to cost taxpayers $200,000.

While in Washington, councillors will meet officials from such Government-sponsored agencies as the Nuclear Regulatory Commission, the Department of Energy and the Federal Emergency Management Agency.

Briefing in France

Hong Kong SOUTH CHINA MORNING POST in English 7 Aug 86 p 1

[Article by Albert Chan]

[Text] PARIS: A near disaster similar to the one that was narrowly avoided at the Bugey nuclear plant could happen at Daya Bay unless the Chinese adopt a $20 million modification plan.

A top official at Electricite de France (EdF) confirmed yesterday that China had not yet made up its mind on whether to accept the recommended equipment modifications.

Mr Pierre Tanguy, inspector general on nuclear safety of EdF, said the Chinese had been informed of the details of the Bugey incident and the necessary modifications required to prevent a similar occurrence.

Such changes had cost 20 million francs (about HK$20 million) for each nuclear station in France and had been made on all the French plants, he said.

He would not comment on why the Chinese have not decided on the modifications to the Daya Bay nuclear plant.

But another EdF official, Mr M. Caillaui, said there is still ample time for the Chinese to make a decision.

He said the plant in Shenzhen will not be in operation until six years from now.

According to Mr Tanguy, the incident on April 14, 1984, was triggered by a "trivial" incident, a short circuit at the reactor of the Bugey station.

External power which should supply electricity for cooling the nuclear reactor was cut off.

There are two diesel generators which were installed as backup power source, but the first one failed to start. The second one started after 45 minutes.

Mr Tanguy conceded that if both diesel generators failed to operate, it could have lead to a similar incident as at Three Mile Island in the United States.

And he added that it would end with a core meltdown in the reactor, which was the worst possible accident in a nuclear plant.

Following the Bugey incident, a full scale investigation was launched and a report released last year recommended that each nuclear reactor in a plant should be connected to four diesel generators, plus a link with a gas turbine generator.

Mr Tanguy also admitted that there had been human error involved.

At the time of the incident, a yellow light went on at the control room following the short circuit, but the operator did not act immediately.

Red lights had since replaced yellow lights in the control panel so that the operator would take prompt action in the future.

Engineers in France, and those from China involved in the Daya Bay project who will receive training in France, will have to learn how to cope with similar incidents.

Mr Caillaui claimed the Bugey case was an incident — not an accident, as it has been described by the media.

He said an incident is something abnormal that occurred, but is rectified by other backup systems and that final safety had not been endangered.

Accident, he said, referred to cases where the backup safety system failed to operate leading to safety hazards such as the Chernobyl case.

During the briefing, EdF officials also said there had been two cases in France where plans to build nuclear stations had been scrapped due to opposition by locals.

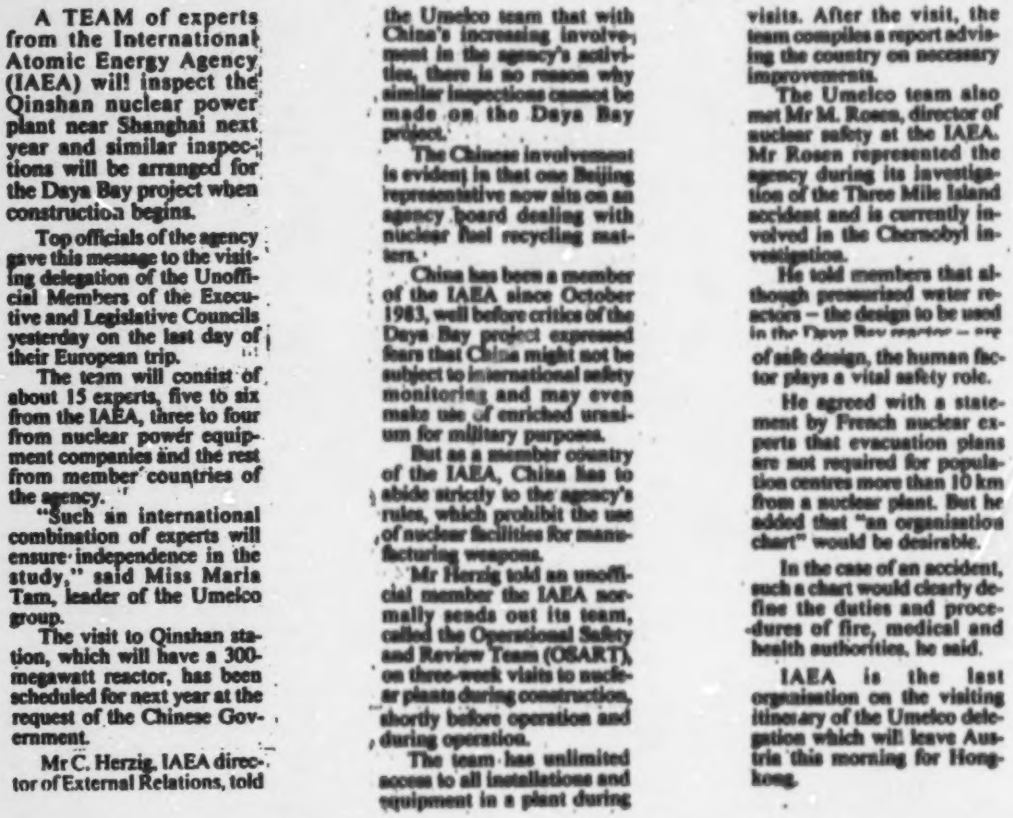
● Leader of the Legco delegation, Miss Maria Tam, said she had asked for the Bugey incident report from French officials.

IAEA Plans for PRC Visit

Hong Kong SOUTH CHINA MORNING POST in English 9 Aug 86 p 19

[Article by Albert Chan]

[Text]



A TEAM of experts from the International Atomic Energy Agency (IAEA) will inspect the Qinshan nuclear power plant near Shanghai next year and similar inspections will be arranged for the Daya Bay project when construction begins.

Top officials of the agency gave this message to the visiting delegation of the Unofficial Members of the Executive and Legislative Councils yesterday on the last day of their European trip.

The team will consist of about 15 experts, five to six from the IAEA, three to four from nuclear power equipment companies and the rest from member countries of the agency.

"Such an international combination of experts will ensure independence in the study," said Miss Maria Tam, leader of the Umelco group.

The visit to Qinshan station, which will have a 300-megawatt reactor, has been scheduled for next year at the request of the Chinese Government.

Mr C. Herzig, IAEA director of External Relations, told the Umelco team that with China's increasing involvement in the agency's activities, there is no reason why similar inspections cannot be made on the Daya Bay project.

The Chinese involvement is evident in that one Beijing representative now sits on an agency board dealing with nuclear fuel recycling matters.

China has been a member of the IAEA since October 1983, well before critics of the Daya Bay project expressed fears that China might not be subject to international safety monitoring and may even make use of enriched uranium for military purposes.

But as a member country of the IAEA, China has to abide strictly to the agency's rules, which prohibit the use of nuclear facilities for manufacturing weapons.

Mr Herzig told an unofficial member the IAEA normally sends out its team, called the Operational Safety and Review Team (OSART), on three-week visits to nuclear plants during construction, shortly before operation and during operation.

The team has unlimited access to all installations and equipment in a plant during visits. After the visit, the team compiles a report advising the country on necessary improvements.

The Umelco team also met Mr M. Rosen, director of nuclear safety at the IAEA. Mr Rosen represented the agency during its investigation of the Three Mile Island accident and is currently involved in the Chernobyl investigation.

He told members that although pressurised water reactors – the design to be used in the Daya Bay reactor – are of safe design, the human factor plays a vital safety role.

He agreed with a statement by French nuclear experts that evacuation plans are not required for population centres more than 10 km from a nuclear plant. But he added that "an organisation chart" would be desirable.

In the case of an accident, such a chart would clearly define the duties and procedures of fire, medical and health authorities, he said.

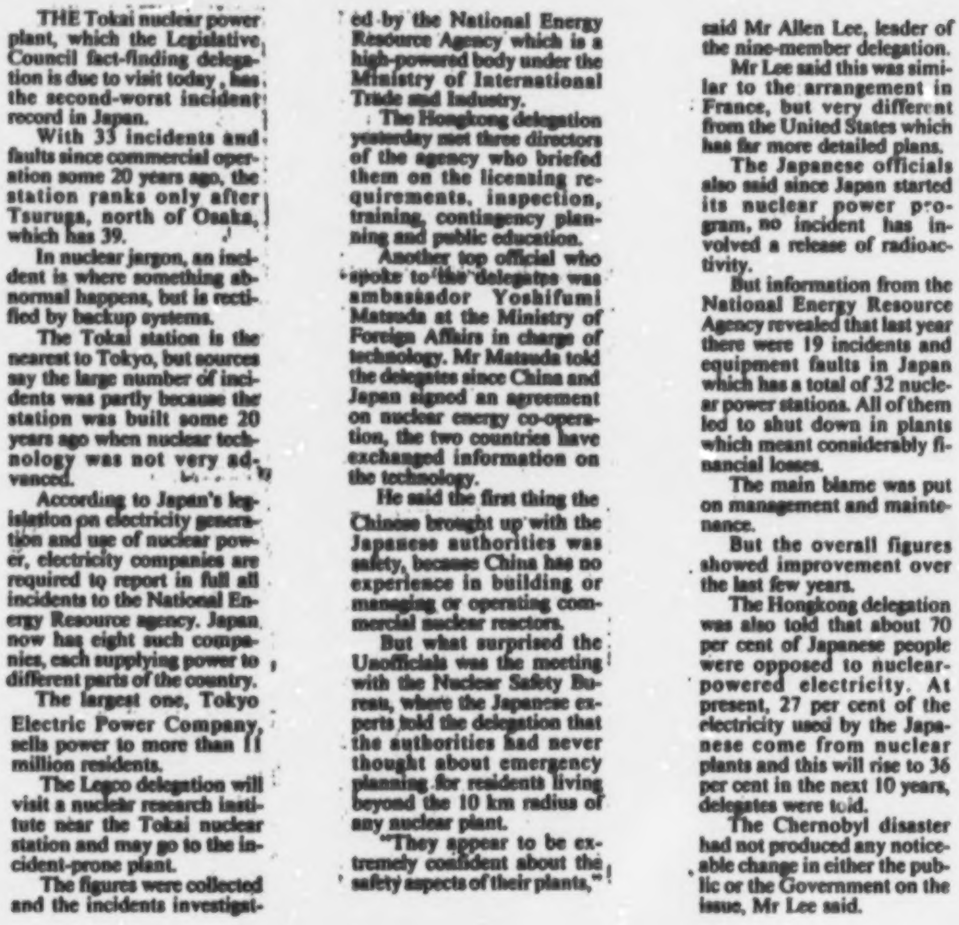
IAEA is the last organisation on the visiting itinerary of the Umelco delegation which will leave Austria this morning for Hongkong.

Japanese Plant Visited

Hong Kong SOUTH CHINA MORNING POST in English 12 Aug 86 p 19

[Article by Albert Chan]

[Text]



THE Tokai nuclear power plant, which the Legislative Council fact-finding delegation is due to visit today, has the second-worst incident record in Japan.

With 33 incidents and faults since commercial operation some 20 years ago, the station ranks only after Tsuruga, north of Osaka, which has 39.

In nuclear jargon, an incident is where something abnormal happens, but is rectified by backup systems.

The Tokai station is the nearest to Tokyo, but sources say the large number of incidents was partly because the station was built some 20 years ago when nuclear technology was not very advanced.

According to Japan's legislation on electricity generation and use of nuclear power, electricity companies are required to report in full all incidents to the National Energy Resource agency. Japan now has eight such companies, each supplying power to different parts of the country.

The largest one, Tokyo Electric Power Company, sells power to more than 11 million residents.

The Legco delegation will visit a nuclear research institute near the Tokai nuclear station and may go to the incident-prone plant.

The figures were collected and the incidents investigated by the National Energy Resource Agency which is a high-powered body under the Ministry of International Trade and Industry.

The Hongkong delegation yesterday met three directors of the agency who briefed them on the licensing requirements, inspection, training, contingency planning and public education.

Another top official who spoke to the delegates was ambassador Yoshifumi Matsuda at the Ministry of Foreign Affairs in charge of technology. Mr Matsuda told the delegates since China and Japan signed an agreement on nuclear energy co-operation, the two countries have exchanged information on the technology.

He said the first thing the Chinese brought up with the Japanese authorities was safety, because China has no experience in building or managing or operating commercial nuclear reactors.

But what surprised the Unofficials was the meeting with the Nuclear Safety Bureau, where the Japanese experts told the delegation that the authorities had never thought about emergency planning for residents living beyond the 10 km radius of any nuclear plant.

"They appear to be extremely confident about the safety aspects of their plants," said Mr Allen Lee, leader of the nine-member delegation.

Mr Lee said this was similar to the arrangement in France, but very different from the United States which has far more detailed plans.

The Japanese officials also said since Japan started its nuclear power program, no incident has involved a release of radioactivity.

But information from the National Energy Resource Agency revealed that last year there were 19 incidents and equipment faults in Japan which has a total of 32 nuclear power stations. All of them led to shut down in plants which meant considerably financial losses.

The main blame was put on management and maintenance.

But the overall figures showed improvement over the last few years.

The Hongkong delegation was also told that about 70 per cent of Japanese people were opposed to nuclear-powered electricity. At present, 27 per cent of the electricity used by the Japanese come from nuclear plants and this will rise to 36 per cent in the next 10 years, delegates were told.

The Chernobyl disaster had not produced any noticeable change in either the public or the Government on the issue, Mr Lee said.

/13046
CSO: 5150/0159

HONG KONG

DAYA BAY PLANS MAY CHANGE AFTER CHERNOBYL

Hong Kong HONGKONG STANDARD in English 1 Aug 86 p 1

[Article by Sheila Dawes]

[Text] LONDON: Despite China's avowed intention to go ahead with the Daya Bay nuclear power station some British industrial circles still expect China to announce this autumn that it has abandoned plans to build the controversial Daya Bay nuclear power station.

Their views, first reported in *The Standard* last November, have gained in strength since the Chernobyl accident and in the light of urgent appeals from Hongkong people to site the project further away from them.

A coal-fired system will be constructed in place of the nuclear plant, sources suggested, and they pointed out that all work carried out at Daya Bay so far could usefully be incorporated in the new plans.

One businessman who visits China regularly said "China has a cash problem."

He said: "For some time now a coal-fired system has made a lot of sense. I expect China to say that plans for a nuclear plant have been halted following anxiety in Hongkong and a wish by China only to build nuclear project after further study has been made of the Chernobyl accident.

"But the main reason for the change will be economic. Coal is much cheaper."

He referred to Chinese communist leaders in Hongkong and claimed they had already let it be known that they would prefer a nuclear station not to be built at Daya Bay.

Britain's GEC, which won a $250 million order to build the conventional turbine parts of the plant at Guangdong would probably be involved in building the coal-fired system, but Framatone of France who won a contract to build the Pressurised Water Reactors were likely to be unlucky, he suggested.

"I doubt if any new nuclear power stations in China will be built by foreign companies. China will build on her own, as it is doing at Quinshen," he said.

Extensive international discussions about nuclear plant safety design and procedures are being arranged by China to ensure that the future projects are as safe as anything in the West.

Several sources suspected that the Guangdong project had shed some of the safety factors as China made a series of tough demands for price-cutting during the tense final months of negotiations for the contracts.

Not only was the Guangdong design likely to be of a design unlicensable in France, but any current French nuclear PWR would be unlicensable in Britain, sources maintained, since Britain's requirements involved "ultra-safe" factors "even before Chernobyl".

Even usually well-informed sources in Britain and Europe have seen only a "fairly sketchy" design of the project.

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CSO: 5150/0162

DEPARTMENT TO MONITOR FOOD RADIATION LEVELS

Hong Kong HONGKONG STANDARD in English 2 Aug 86 p 3

[Text] THE eating habits of Hongkong residents will be studied as part of the Background Radiation Monitoring Programme which will make it possible to detect differences when the Daya Bay nuclear plant goes into operation.

The study, to be launched next year, will be carried out by the Census and Statistics Department at the invitation of the Royal Observatory and is expected to be completed in two years.

Senior Scientific Officer, Dr M C Wong, who heads the Radiation Monitoring Division of the Royal Observatory, said the study was very important as its findings would affect the accuracy of the whole monitoring process.

"Many foods contain radioactive materials. We do not just eat food, we take in radiation as well. Therefore, we have to calculate the amount of radiation we take everyday and add it to the amount of radiation measured from other areas," Dr Wong said.

"The total amount of radiation will form the background radiation level in Hongkong," he said. He pointed out that the amount of radiation we take daily is negligible and will do no harm to our bodies.

The study will be based on figures already available at the Census and Statistics Department. These will include import figures for food, the amount of food produced locally, and statistics on family consumption.

Dr Wong said that the system purchased for monitoring background radiation levels would arrive early this month.

He said findings of this $3 million system would definitely be published.

Results of the meteorological survey around Daya Bay, which is essential to the study of atmospheric dispersion, will be available to the public as well.

Dr Wong said the Royal Observatory has been carrying out meteorological studies in Daya Bay for two years. Analysis of its first year's study will be available in a few months' time, he added.

/13046
CSO: 5150/0161

CANADA

SASKATOON FIRM TO REPROCESS RADIOACTIVE URANIUM WASTE

Toronto THE GLOBE AND MAIL in English 16 Aug 86 p B5

[Text] Amok Ltd. of Saskatoon appears to have found a solution to a six-year-old problem — what to do with 2,916 concrete vaults full of radioactive uranium waste.

Bernard Michel, executive vice-president, said the company will spend $2.6-million, beginning next month, to modify its mill at Cluff Lake in northern Saskatchewan.

The improvements will enable Amok to reprocess the waste, lowering the level of radioactivity, and at the same time to extract gold and uranium.

The plan has been approved by the Atomic Energy Control Board in Ottawa and the Saskatchewan Environment Department.

Mr. Michel said the plan is designed for environmental and worker safety and may result in a $1-million profit for the company.

About 283,000 grams of gold worth about $4.5-million at current prices and 56,700 kilograms of uranium oxide worth about $3.3-million are expected to be recovered, he said.

The problem began when Amok began to mine uranium ore at Cluff Lake in 1980.

Tim Meadley, the company's safety and environment manager, said no one had dealt with such high grades of ore before and Amok was unsure how best to handle the highly radioactive solid waste that resulted from the milling process.

When deterioration and storage problems resulted in cracks and leakage from a number of the vaults in 1983, Amok stepped up its search for a solution and finally settled on a process that would recover both uranium and gold.

"If something is deteriorating, you don't want to keep it around to keep deteriorating, so the sooner you can get rid of it the better," Mr. Meadley said.

The Cluff Lake mine is owned 80 per cent by Amok, a French consortium, and 20 per cent by the provincial Government through Saskatchewan Mining Development Corp.

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CSO: 5120/48

CANADA

ONTARIO DECISION TO COMPLETE DARLINGTON PLANT REPORTED

Toronto THE GLOBE AND MAIL in English 21 Aug 86 p A5

[Article by Robert Sheppard]

[Text]

After a year-long review, the Ontario Government has decided to complete construction of the $11-billion Darlington nuclear power plant 50 kilometres east of Metropolitan Toronto.

At the same time, to appease critics of the controversial project, the Liberal Government will launch a special study by "internationally recognized experts" of the safety standards of the Candu nuclear system.

To be established this fall after the Legislature reconvenes, the nuclear inquiry will be the third major study of the safety of the Candu system in Ontario in the past eight years, and reflects the post-Chernobyl caution that has imbued the nuclear industry and its Government proponents.

The Liberals, who were opposed to the completion of the project when in opposition, have already said that Darlington will be the last nuclear station built in the province for the foreseeable future.

In giving final approval to the project yesterday, Energy Minister Vincent Kerrio said the deciding factors were the uncertainties of other options and the $7-billion that had already been committed to the plant.

Nearly $2-billion of this has been spent in the past year, since the Liberals assumed power and turned the question of completing Darlington over to a legislative committee to review.

The Cabinet decision to complete Darlington was made two weeks ago at the last meeting attended by Premier David Peterson, who is away on holidays. But the announcement and go-ahead letter to Ontario Hydro chairman Thomas Campbell was not signed until yesterday because Mr. Kerrio was also away, a Government official said.

In approving Darlington and agreeing to set up another study of nuclear safety, the Government is adopting two of the major recommendations of a legislative committee that reported in early July.

At the same time, the Government is putting off, at least for the time being, other recommendations of the committee, particularly that Ontario Hydro be made more accountable to the Legislature and the public.

The special legislative committee on Darlington first reported in December that Ontario Hydro had overestimated by almost three times the peak demand for power at the turn of the century, and may not even require the energy from the four Darlington reactors, to be completed by 1992, until well into the 21st century.

Nuclear reactors are generally planned with a life expectancy of about 40 years, after which they are dismantled and their radioactive parts stored.

In July, the committee recommended completing the $11-billion plant "because of Darlington's low incremental cost and the uncertainties associated with other short-term options."

The New Democratic Party members of the committee dissented from both reports, arguing that completing only two of the four Darlington reactors would save the province at least $4-billion and that Ontario is already overly dependent on nuclear power, with at least 40 per cent of its energy coming from this source.

The nuclear industry was quick to applaud the Government's decision yesterday, issuing a detailed press statement that arrived within an hour of Mr. Kerrio's own news release.

New Democrat Ruth Grier said the Liberal decision represents "a mega-mistake" and the province is wrong to put so much emphasis on nuclear development.

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CSO: 5120/48

HUNGARY

BRIEFS

INDUSTRY MINISTER ON NUCLEAR POWER GENERATION--[Begin Kapolyi recording] These days, with regard to CEMA integration, the utilization of natural resources based on mutual advantages will continue, but expansion will be marked by cooperation such as the joint development of the peaceful utilization of nuclear energy, first and foremost for producing electric energy; by the utilization, with CEMA countries' joint collaboration, of certain natural resources, first and foremost hydrocarbons. In short, a process has evolved that ensures for all of us that everyone should pursue this extremely difficult vocation only at places, to an extent and with the use of technical means, where the work can be valued satisfactorily. [end recording] In harmony with the development of the economy, the Hungarian electrical energy system must be expanded, said the minister. [Excerpt] [From the "Evening Magazine" program] [Budapest Domestic Service in Hungarian 1630 GMT 4 Sep 86 LD] /9274

CSO: 5100/3053

ENERGY EXPERT DISCUSSES NEEDS, NUCLEAR POWER PLANTS

Belgrade PRIVREDNI PREGLED in Serbo-Croatian 18 Jul 86 p 4

[Article by T. Kapetanic: "Dr Hrvoje Pozar Talks About Nuclear Power Plants: Coal Situation Indicates Need for Nuclear Power Plants"]

[Text] Lignite reserves are not inexhaustible. Dynamic economic development implies rapid increase in electric energy generation.

Energy conservation and nuclear power plants are again in the center of attention. In many circles there is insistence on overall analysis of Yugoslav energy potential and needs, and also of conservation and its scope, this being is a requirement for basing the need for building nuclear power plants on valid arguments. The federal government is preparing a strategy for development of power engineering. It will be ready for autumn debate in the Yugoslav Assembly.

About a hundred experts have taken part in the discussions concerning construction of four nuclear power plants in Yugoslavia, but they do not include Academician Dr Hrvoje Pozar, a power engineer in Zagreb. He headed a subgroup of the Krajger Commission which developed the strategy for long-term development of Yugoslav power engineering within the framework of the long-term economic stabilization program. The question consequently arises whether the Federal Executive Council is at work on a new strategy for development of power engineering or whether the opinion of the eminent experts who have already completed their complicated task will be followed. In an address delivered recently at the headquarters of the Association of Engineers and Technicians of Croatia, Dr Pozar also spoke of nuclear power plants. He called attention to the need for building nuclear power plants [illegible] the light of the anticipated future increase in electric power consumption and the potential for satisfying this consumption need by building conventional coal-fired hydroelectric and thermoelectric plants.

The minimum alternative anticipates an average consumption increase of 4.8 percent per year over the next 35 years, according to Dr Pozar. According to electric power industry estimates, this increase will be nearly 5 percent (4.99 percent). Yugoslav consumption in 1985 was as high as 6.4 percent. It should be pointed out that the consumption per inhabitant in Yugoslavia is among the lowest in Europe. Consumption lower than that in Yugoslavia is found only in Greece and Portugal.

"Irrational energy consumption has been discussed with increasing frequency of late. I am fundamentally in agreement with the finding that consumption is irrational. My analyses nevertheless show that the consumption of forms of energy other than electricity is much more irrational. Heat is the least rationally consumed, and is also the area of heaviest consumption. Consumers utilize around two-thirds of the total amount of energy in this form.

"According to the minimum estimate, 5,751 billion kilowatt-hours will be needed from 1984 to 2020, and 7,174 billion according to the maximum estimate. To the end of this century, the thermoelectric power plants already built and the Krsko nuclear power plant will generate 767 billion kilowatt-hours, including 610 billion in coal-fired thermoelectric power plants, while hydroelectric plants, including pumped storage hydroelectric plants, will generate 1,740 billion, assuming that all the economically justified water power resources are developed. The entire potential already completed can satisfy 43.5 percent of the requirement if the minimum estimate is adopted, and 35 percent if the maximum is adopted. The remainder must be generated in coal-fired thermoelectric plants and nuclear power plants.

"In the light of the current level of development, in the immediate future only nuclear power plants with thermal (slow) reactors can be considered, along with hydroelectric and conventional thermoelectric plants, and in 10 to 15 years probably fast reactors as well. Can we wait until more reliable and economical energy sources are found? In the next 10 to 15 years, of the promising energy sources only fast reactors, the so-called breeder reactors, will be commercially ready. The specific fuel costs in such reactors will probably be lower than in the current thermal reactors, but the specific investment per unit power will certainly be higher because of the more complicated design. The introduction of breeder reactors into the system will be possible really only after the thermal reactors, in which the plutonium needed for breeding, have been in operation long enough. The period of development of such reactors to commercial readiness is a very long one. Up to the present it has not been possible to perform energy-active nuclear fusion even under laboratory conditions.

"The most recent estimates of coal reserves in Kosovo, not officially confirmed, indicate increased lignite reserves. Generation in thermoelectric plants can be increased by 2.023 billion kilowatt-hours, and the needs of thermoelectric plants built up to 2020 based on the minimum estimate can be satisfied with this amount, but only 86.7 percent of the needs based on the higher estimate. Consequently, the needs cannot be met even with the larger reserves. Regardless of whether smaller or larger reserves of coal are involved, all calculations show that we will have no coal by the year 2020."

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CSO: 2800/320

ALFONSIN ON NUCLEAR ARMS RACE

PY252137 Buenos Aires TELAM in Spanish 1201 GMT 25 Aug 86

[Text] Buenos Aires, 25 Aug (TELAM) -- Argentine President Raul Alfonsin has stated that the most imperative task of all states is to prevent the outbreak of a nuclear war and the only way to save the world from this threat is to eliminate nuclear weapons.

This was Alfonsin's answer to Yuriy Rublevskiy and Isidoro Gilbert, correspondents of the Soviet news agency TASS, who interviewed Alfonsin at the request of the Moscow daily PRAVDA to discern his opinion concerning the eradication of atomic arsenals in general and the 18 August decision by the Soviet Government to extend the moratorium on all nuclear tests until the end of the year in particular.

Alfonsin said: In our joint declaration of 22 May 1984 and in the New Delhi Declaration of 28 January 1985, we (the heads of government of the "Group of Six") stated that the tests, production, and deployment of nuclear weapons and their carriers must cease and a substantial reduction of nuclear forces must follow immediately.

This is the course of action that we propose to use to put an end to the nuclear arms race and to achieve nuclear disarmament, he added.

He continued: In this regard we have been notified of the Soviet Government's decision to extend the moratorium on nuclear tests, and we must express our satisfaction over this measure.

Alfonsin concluded by saying that to take this measure a step further we recently proposed in Mexico the establishment of a suitable verification mechanism, and offered to General Secretary Gorbachev and President Reagan to arrange a meeting of experts from our countries (of the Group of Six) with Soviet and U.S. experts.

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CSO: 5100/2118

NUCLEAR INSPECTION CLAUSE WITH ARGENTINA REJECTED

PY201448 Madrid EFE in Spanish 1517 GMT 19 Aug 86

[Text] Buenos Aires, 19 Aug (EFE) — Brazil has rejected a clause of mutual inspection with Argentina in the area of nuclear energy. The clause was to be included in the integration agreement between the two countries, signed by Presidents Jose Sarney and Raul Alfonsin two weeks ago.

The daily TIEMPO ARGENTINO today published exclusive remarks by Jose Goldemberg, rector of the University of Sao Paulo, who said that it is not in Brazil's interest to accept such inspections, even though it does not intend to produce nuclear arms.

On the other hand, sources from the Argentine nuclear sector today said that they are "in direct communication with the people in Brazil" about the facilities in Serra do Cachimbo which, according to the Brazilian press, are capable of testing nuclear arms.

The Argentine position favors signing an agreement of mutual inspection to prevent either of the two countries from using nuclear energy for military purposes, but without the obligation to disclose industrial secrets. Argentina possesses an advanced nuclear industrial technology. The country's products range from natural uranium to the heavy water needed to cool its three nuclear reactors now in operation. Argentina also manufactures Zircaloy tubes, needed to place the enriched uranium inside the reactor.

/9738
CSO: 5100/2114

ARMED FORCES OFFICIALS 'UNAWARE' OF NUCLEAR TALKS

Amaral Oliveira Comments

PY231906 Sao Paulo FOLHA DE SAO PAULO in Portuguese 21 Aug 86 p 9

[Excerpt] Rio de Janeiro -- Armed Forces General Staff (EMFA) Chief Jose Maria do Amaral Oliveira, 60, said yesterday that he is unaware of the existence of studies for an agreement of mutual inspection of nuclear facilities between Brazil and Argentina as Itamaraty Secretary General Paulo Tarso Flecha de Lima told FOLHA DE SAO PAULO on 18 August. Amaral Oliveira reasserted that the facilities at the Cachimbo test site are exclusively designed for testing conventional weapons and denied that Brazil is interested in building an atomic bomb. He said: "Brazil is an earnest country. We have signed the Tlatelolco treaty (by which the signatories commit themselves to use nuclear energy just for peaceful purposes) and we will fulfill it." [passage omitted]

Saboia Comments

PY232108 Sao Paulo FOLHA DE SAO PAULO in Portuguese 22 Aug 86 p 4

[Text] Rio de Janeiro -- Navy Minister Henrique Saboia, 60, said yesterday in Rio de Janeiro that he is unaware of the drafting of an agreement of mutual inspection of nuclear facilities between Brazil and Argentina. He said: "If such an agreement is being discussed, then Itamaraty is the agency concerned. The ministers of state just fulfill the resolutions of the diplomatic agreements." According to the Navy minister, there is great cooperation between the Brazilian and Argentine navies, However, he also said that he is unaware of the possibility of a technological agreement between the two countries to build submarines.

Saboia came to Rio de Janeiro to preside over the ceremony to accept the training ship "Brasil" for the Navy fleet at the Ilha das Cobras shipyard (at Guanabara Bay), where the ship was built. According to cost estimates made by Henrique Saboia, 83 percent of the ships equipment was manufactured in Brazil. The vessel cost nearly $100 million.

The Brazilian Navy hopes to complete in 1991 a program to expand its fleet at a total cost of $1.5 billion. A total of $450 million will be spent to build three submarines.

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CSO: 5100/2115

BRAZIL

FRG MINISTER COMMENTS ON NUCLEAR AGREEMENT

PY201730 Rio de Janeiro O GLOBO in Portuguese 19 Aug 86 p 18

[Text] The FRG Government does not intend to renegotiate with the Brazilian Government the basic Nuclear Agreement signed between the two countries in 1975 in view of Brazil's decision to reduce its rate of development by postponing several projects. It will complete only the Angra II and Angra II nuclear power plants.

This intention will be restated today by FRG Research and Technology Minister Heinz Riesenhuber during a meeting with President Jose Sarney and Science and Technology Minister Renato Archer. Riesenhuber yesterday explained in Rio de Janeiro that he also does not believe that Brazil is interested in renegotiating the agreement between the governments since the necessary adjustments will be made only by the enterprises involved (KWU and Nuclebras).

The main goal of the FRG minister's visit to Brazil is to hold discussions with Brazilian authorities in order to identify projects aimed at expanding technological cooperation. As an example, he cited the health, environmental, biotechnology, and electronic research fields.

Riesenhuber denied reports that the FRG will not enter into an agreement with Brazil similar to the one signed in 1975. He made it clear that there has been a misinterpretation and that the fact that a decision has now been made to build only two reactors and not eight does not change in the least the broad cooperation agreement between Brazil and the FRG.

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CSO: 5100/2114

BRAZIL

IAEA OFFICIAL TERMS ANGRA DETECTION SYSTEM SAFE

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 12 Aug 86 p 24

/Text/ Rio de Janeiro--Enzo Iansiti, scientific secretary of the international advisory group on nuclear safety, subordinate to the International Atomic Energy Agency (IAEA), said yesterday that "the Angra I nuclear power plant has one of the most advanced failure detection systems in the world, in both equipment and personnel." The specialist in the safety of atomic energy plants, who attended the International Conference on the Safety of Reactors and Pressurized Water yesterday afternoon at the Petrobras auditorium in Rio, said that, before coming to Brazil, he studied IAEA's emergency planning provisions relevant to the conditions of the Brazilian power plant.

Camilo Penna, president of Furnas, who also attended the international conference, said in turn that the Angra I nuclear power plant can be put back into operation within 20 to 30 days. He said that within 10 days the Federal Court of Appeals (TFR) will determine whether the power plant's case can be tried within the jurisdiction of the state court or the federal court.

He then referred to the appeal made to the Justice Department, supported by the community of the Rio municipality of Angra dos Reis, site of the first Brazilian nuclear power plant. He said in this regard that the reason for the appeal--the lack of an emergency plan of common knowledge to the people--will likely be taken care of in the near future. The former minister of industry and commerce also said that he is now awaiting disclosure of the emergency plan by the federal government's Civil Defense Department, subordinate to the Ministry of Inteior.

In speaking of the Angra I emergency plan, Enzo Iansiti stated emphatically that the most important point is to have a plan which is workable and trustworthy; he made no further remarks about the Brazilian power plant saying that it was not up to the IAEA inspector to evaluate the true conditions of the dountry's first atomic energy plant for the production of power. Iansiti stressed that the Angra I plant's safety detection system "is the best among those of all developing countries in equipment, personnel, training and computerization."

Chernobyl Lesson

The IAEA secretary said that there were acts of heroism during the Chernobyl accident in Kiev in the Soviet Union and that "many individuals sacrificed their lives trying to make the plant a safe place in which to work."

In speaking about the lesson learned from the Chernobyl accident, Iansiti said that "the most important thing which occurred in connection with the Kiev accident was the verification that much can be done to obviate the release of radioactivity into the water and atmosphere." He said that on 25 August the IAEA is going to begin a 5-day seminar in Vienna "at which the Russians will give a detailed account of what really happened at Chernobyl."

Accidents

Jose Golbemberg, rector of Sao Paulo University, will take part in the International Conference on Nuclear Energy today. In his speech he will deal principally with the subject of the safety of hydroelectric and nuclear power plants and will assert that "the Chernobyl accident showed that the risks accompanying nuclear accidents affect much greater areas than those affected by possible accidents in hydroelectric plants which, by their very nature, result in much less extensive damage."

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CSO: 5100/2111

BRAZIL

NAVY CARRIES OUT OWN NUCLEAR RESEARCH PROGRAM

PY270316 Sao Paulo FOLHA DE SAO PAULO in Portuguese 23 Aug 86 p 4

[Text] The Brazilian Armed Forces are carrying out a nuclear research program which parallels the government program, based on a 1975 agreement with the FRG. By 1994, the Brazilian Navy expects to test the prototype of a small nuclear reactor called "critical reactor" [reator critico], which will serve as a model for a "compact reactor" that will be the propelling unit of the first Brazilian nuclear submarine. This submarine is expected to be built by the second half of the 1990's.

Part of the machinery to build and operate this test reactor is being designed in the Nuclear Engineering Institute [IEN], linked to the National Commission for Nuclear Energy [NEN], and located on the campus of the Rio de Janeiro Federal University [UFR] on Fundao Island, north of Rio de Janeiro. The IEN is cooperating with the so-called "instrumentation stage" of the project. The hull of the first Brazilian nuclear submarine is being studied by the Navy and the Nuclebras heavy equipment corporation, [NUCLEP], a Nuclebras subsidiary in charge of the design and building of the heavy components of the Brazilian nuclear reactors.

The Brazilian Aeronautics Ministry is also studying the possibility of building a more sophisticated reactor known as a "fast breeder" [in English] or a "regenerator reactor" [reator regenerador], which continues working after consuming its initial fuel. The Aeronautics Ministry projects are being developed at the Advanced Studies Institute [IEAV] of the Aerospace Technology Center [CTA] in Sao Jose dos Campos [97 km northwest of Sao Paulo]. The Navy projects are being developed at the Institute for Nuclear and Energy Reserach [IPEN], also linked to the CNEN, and at the IEN.

Both the Navy and Aeronautics Ministers are carrying out research to enrich uranium--that is, to separate uranium isotopes, U-235 and U-238, (number of protons ad neutrons of the atomic nucleus) to produce plutonium--which is a necessary element for nuclear fission. The Navy and the Aeronautics Ministers concentrated on the uranium-enrichment process through the use of laser beams, which "excite" and modify the original structure of natural uranium. A nuclear engineer, who served on the commission created by President Sarney to re-evaluate the Brazilian nuclear program, became familiar with the uranium-enrichment research carried out at the IEAV by the Brazilian Air Force [FAB].

FOLHA DE SAO PAULO also learned that the FAB is working on plans for a linear accelerator of particles [acelerador linear de particulas] to establish measures for nuclear parameters. For at least 5 years, all this research has been headed by Brigadier General Hugo de Oliveira Piva, former IEAV director. Meanwhile, the nuclear research of the Army Technological Center [CETEX], is considerably behind schedule.

The test reactor developed by the Navy is the result of 4 years of research which began after a team from the Navy Research Center (formerly the Navy Research Institute, which works on Governador Island in Rio De Janeiro) went to work at the Nuclear Research Institute. The project has already been approved by the CNEN, and the security of all the works to develop the propelling system of the first Brazilian nuclear submarine is bring supervised by the Naval Intelligence Center [Cenimar], headquartered in Brasilia.

The reactor -- which is actually a prototype -- must be tested on land in 8 years. It will serve as a model for the so-called "compact reactor," the size of which will depend on the size of the nuclear submarine. Initial calculations estimate that the submarine will be 70 meters long and will deplace 2,500 tons of water at surface and 2,700 tons underwater. It will be a small-sized nuclear submarine, comparable to the smallest in its category built in France.

It is thought that the "compact reactor" will be aided by diesel motors or gas turbines, like the system used by the same sort of vessels in the French and Soviet Navies. The so-called conventional motors give the nuclear submarine's crew a greater degree of safety, mainly during submersion and if there is a problem with the reactor.

The Navy intends to design its nuclear submarine based on the building experience of a conventional German submarine: the IKL-209-1400. The first of these ships is being built in the FRG, and its construction is being followed by a group of Brazilian Naval engineers. Three other units will be produced in the Rio de Janeiro Navy shipyard.

FOLHA DE SAO PAULO found out the Brazilian Navy is not satisfied with the German IKL construction because it is not respecting the construction technology of the IKL-209-1400, to the extent expected by the former government Naval authorities, who signed the contract with the Germans. This observation was raised to the FRG Defense Minister Manfred Worner, (an airplane pilot) who visited Rio de Janeiro, Brasilia, and Sao Paulo about 3 months ago, but no positive results were obtained. Worner maintained that his government could not intervene in a contract between Brazil and a private German company.

The IKL-209-1400 was chosen after the Navy examined with great interest the Italian submarine "Nazario Sauro," which is heavier than the German model. Besides, the Italians refused to transfer their vessel's building technology to the extent the Brazilians desired.

The Brazilian nuclear submarine will carry completely conventional and reduced weaponry: only six torpedo tubes (instead of the usual eight on a conventional submarine). Its speed will reach between 25 and 30 knots, according to the same initial calculations.

The building of a nuclear submarine will lead Brazil to other types of research. For example, the type of steel to be used in the IKL-209-1400 will be HY-80 steel (a special type of steel for the hull designed to resist great pressure underwater). Certainly, Brazil will be ready to begin construction on a nuclear submarine by the end of the next decade.

The nuclear researchers of the Brazilian Armed Forces together with the scientific institutions constitute a nuclear program parallel to the one defined 11 years ago when Brazil and the FRG signed the so-called nuclear agreement. A FAB colonel who works in this field and who was consulted by FOLHA DE SAO PAULO, preferred to call the program the "national nuclear program."

The commission created last September by President Sarney to re-evaluate the Brazilian nuclear program, did not bother to investigate whether or not the Armed Forces could be researching nuclear technology to apply to its war machines. What is more, the Brazilian Society of Physics does not believe the Navy nor Aeronautics ministries may already possess qualified teams of experts to design sophisticated reactors, such as the "fast breeder" type.

FOLHA DE SAO PAULO also found out that CTA experts are researching on the use of thorium, which is a mineral found widely in Brazil and India, as fuel for a future nuclear reactor.

/6091
CSO: 5100/2119

PLANT CONSTRUCTION LIMITATION TO THREE DEEMED SUFFICIENT

Nuclear Plants Considered Nonessential

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 8 Aug 86 p 3

/Text/ The president of the republic has just approved a new schedule of projects to be included in the Brazilian nuclear program calling for the installation of the Angra II and Angra III power plants by 1992 and 1995 respectively together with carrying out the agreement signed with the FRG. Nothing more is to be included in that program which initially called for the construction of eight nuclear power plants at an expenditure of $25 billion to $30 billion.

Jose Sarney was correct in his decision; not that we would be carrying out such a burdensome program but simply because the materiel for the two plants now to be installed as supplements to the Angra I to complete the Angra dos Reis nuclear park has already been purchased and, for the most part, delivered to Rio de Janeiro. The equipment is stored at the atomic reactor factory in Itaguai (yes, General Ernesto Geisel also bought a secondhand factory from the Germans). Therefore, there is nothing more logical than to install this equipment for whose import we are paying a high rate of interest, amounting to approximately $4 billion. As Camilo Penna, president of Furnas, remarked a short time ago, our country is not wealthy enough to extract dollars from the sea.

It is well to recall that, in addition to the two German nuclear power plants, we have an initial plant imported from the United States ready to start up after the completion of certain tests and momentarily shut down for normal periodic maintenance. Moreover, the American plant is now under a restraining order instigated by the people of Angra subsequent to the Chernobyl accident in the USSR. It is this plant and not those which we shall be building with German financing which will be helping the southern and southeastern areas in face of the serious threat of severe rationing of electric power foreseen before the end of this year. Therefore, we cannot confuse the emergency projects, such as the activation of the oil and coal thermal plants and the nuclear energy plants, with the two new undertakings heretofore held in abeyance and now given the green light by the president. The program consists of two stages, one over the short term and the other over the intermediate term. In fact, the nuclear plants scheduled to start up in 1992 and 1995 are allegedly nonessential inasmuch as we could unquestionably supplement the thermal energy systems with oil-fired plants, oil being a commodity which we have available in increasing quantities, or coal of which we have a surplus and no market, not to consider the possible use of gas from Campos where new reserves are being discovered almost on a daily basis. However, since Gen Geisel has launched us on this adventurous program, leaving it to his successors to bear the heavy burden of faits accomplis--physically accomplis, since German industries have produced and rapidly sent us the equipment under consideration--there is nothing else to do than to take every possible advantage of the situation and reduce the costs as much as possible while observing the strictest safety precautions. We cannot let ourselves be dominated by the Chernobyl syndrome as we have frequently asserted.

However, we have reason to question the fulfillment of the nuclear accord signed in 1975 with the FRG, or at least to insist on a careful review of that accord. This is the case unless the Brazilian Government has already informed the FRG that is does not intend to carry out that accord insofar as the purchase of new nuclear plants is concerned, as initially planned. We should install only those plants which, unfortunately, we cannot ship back to Germany, since they undeniably belong to us. We are paying a high price for them. The equipment is here; what can we do? But there should no question of purchasing additional dangerous and dispensable nuclear power plants in a country which possesses immense hydraulic potential in addition to oil, coal and gas.

Therefore, we are convinced that the president acted wisely. Nevertheless, he should reassert, as he did 8 months ago, that three expensive, dangerous and technically dispensable nuclear power plants are sufficient for Brazil in this century. Even too much.

MME Official's Comment

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 12 Aug 86 p 24

/Text/ Brasilia--Paulo Richer, secretary general of the Ministry of Mines and Energy, said yesterday that the decision made by President Jose Sarney to complete the Angra II and Angra III nuclear power plants by 1992 and 1995 respectively was very wise inasmuch as the $2.25 billion to be invested for the production of about 2,600 MW represents the most opportune expenditure which could be made to produce that quantity of power for the southeastern area.

According to Richer, no hydroelectric power plant built in the southeastern area by 1992 and 1995 could produce as much power as that which will be produced in Angra dos Reis at such a low cost and in such a short time. $1.05 billion will be invested in Angra II and $1.2 billion in Angra III. The MME secretary general's reasoning does not take into consideration what has already been spent for the two power plants ($1.4 billion since 1976: $1.07 billion for Angra II and $330 million for Angra III) or the finance costs, estimated at $2 billion for the current schedule of events (1992 and 1995). The finance costs may be even greater if the projects fall behind schedule.

The two nuclear plants are near Rio de Janeiro; this will result in a saving in transmission lines. The plants will operate 24 hours per day at 90 percent of their normal capacity--the average of German reactors of the same type.

8568
CSO: 5100/2111

BRAZIL

BRIEFS

PIRES ON NUCLEAR CYCLE MASTERY--Brasilia--Army Minister General Leonidas Pires Goncalves said yesterday that, besides being a right, it is an obligation for Brazil to master the entire nuclear cycle due to the benefits which this can bring to the country and its people. "Any country which enters the 3d millenium without having mastered the nuclear cycle will not be a world power," said the minister in whose opinion the advantages of energy originating from nuclear fusion are "unforeseeable" and "immeasurable." He then went on to say that, in the case of nuclear fusion, there is not even the risk of having to live amid nuclear waste. The minister ended his interview with the comment that Brazil does not have the necessary funds or technology to carry out nuclear projects for nonpeaceful purposes. /Text/ /Sao Paulo O ESTADO DE SAO PAULO in Portuguese 13 Aug 86 p 2/ 8568

NUCLEP, NUCLEI ELIMINATION RECOMMENDATION--Rio de Janeiro--Licinio Seabra, president of NUCLEP, said yesterday in Rio that this state firm is now 60 percent idle and that he therefore agreed with the recommendation made by the committee appointed to re-evaluate Brazil's nuclear program and chaired by physicist Israel Vargas that this firm be eliminated together with the other Nuclebras auxiliary, NUCLEI. According to Licinio Seabra, the elimination of NUCLEP and NUCLEI will be reviewed by the Ministry of Mines and Energy which will determine the fate of the two state firms in accordance with the initial objectives of the nuclear program which included the construction of eight power plants. The NUCLEP president recalled that the committee responsible for re-evaluating the country's objectives in the nuclear sector recommended the construction of only two power plants, the Angra II and the Angra III; this was to justify the investments already made in the Angra dos Reis plant, including civilian projects. On the 2d day of the International Conference on the Safety of Nuclear Reactors, attended by the NUCLEP president and Israel Vargas, adviser to the Ministry of Mines and Energy, Rex Nazareth Alves, president of the National Commission for Nuclear Energy (CNEN), gave his assurance that the Angra I power plant has all the safety features necessary. Professor Joaquim de Carvalho, associated with the Sao Paulo Power Company, criticized the conference, sponsored by the Brazilian Academy of Sciences, saying that "there was general discussion of certain aspects of the risks inherent in the operation of nuclear power plants and their impact on the environment but that, even here, the discussion was limited." In his opinion, it would be interesting to extend the discussion to the "impact on social and human ecology." /Text/ /Sao Paulo O ESTADO DE SAO PAULO in Portuguese 13 Aug 86 p 24/ 8568

NAVY MINISTER ON ATOMIC BOMB--Navy Minister Henrique Saboya reasserted today in Rio de Janeiro that there is no definite plan for the production of enriched uranium to be used as fuel for the propulsion of submarines built in Brazil. The minister stated that studies on nuclear energy being developed by the Navy with the cooperation of scientists at the University of Sao Paulo are aimed at a future project. He added that the fact that a nuclear-propelled submarine is to be built does not mean that Brazil already has the technology to build an atomic bomb. [Text] [Brasilia Domestic Service in Portuguese 2200 GMT 4 Sep 86 PY] /6091

FORMER NAVY MINISTER ADVOCATES ATOMIC BOMB--Rio de Janeiro, 5 Sep (AFO)--In a statement released here today, former Brazilian Navy Minister Admiral Maximiano Fonseca advocated the manufacture of an atomic bomb in Brazil. If it was up to me to decide, I would make an atomic bomb and detonate it in front of international observers to demonstrate the extent of national technical know-how, the admiral said. Maximiano Fonseca, navy minister under General Joao Baptista Figueiredo, last of the military rulers, launched research on nuclear propulsion in Brazil. The existence of this research was confirmed yesterday evening by the current navy minister, Admiral Henrique Saboya, who admitted that Brazil wants to develop its own technology to build nuclear submarines. In his plea for a Brazilian atomic bomb, Fonseca stated that one hates to see the big powers developing and detonating atomic, cobalt and neutron bombs without being able to do the same ourselves. [Text] [Paris AFP in Spanish 2136 GMT 5 Sep 86 PY] /9274

CSO: 5100/2123

INDIA

CORRESPONDENT INTERVIEWS AEC CHAIRMAN RAMANNA

Calcutta THE STATESMAN in English 7 Aug 86 p 9

[Interview with the Chairman of the Atomic Energy Comission, Dr Raja Ramanna by V. S. Maniam; date and place not given]

[Text]

NEW DELHI, Aug. 6.—According to the chairman of the Atomic Energy Commission, Dr Raja Ramanna, nuclear power remains "probably the safest, cleanest and cheapest" source of electrical energy "despite the recent incident at Chernobyl".

Dr Ramanna, who was replying to a series of questions by The Statesman on the AEC's work, said the hazards to mankind from nuclear technology arose not from civilian nuclear power stations but from the nuclear weapons programme of the nuclear weapons nations.

On cost, he repeated that nuclear power was already economically viable: "The present cost of electricity from our nuclear stations ranges from 33 paise to 50 paise a unit, which compares very favourably with the cost of electricity from thermal power stations".

What is more important is that the country's nuclear power stations are now earning significant revenues. "It is no exaggeration to state that investments in atomic energy have yielded handsome dividends to the country".

Dr Ramanna noted that several factors had impeded the progress of India's nuclear power generation, not the least of which was what he described as the post-1974 international situation and the "restriction imposed by foreign countries on export of critical equipment to India". Nineteen seventy-four was the year of the peaceful nuclear explosion at Pokhran in Rajasthan.

Dr Ramanna rounded off his answers with the firm assertion that, with dwindling natural resources of coal, oil and gas, "nuclear power—be it from present-day reactors and breeders or from fusion—will be the only answer for meeting mankind's energy needs in the decades to come".

The following are the questions put to the AEC Chairman—questions which he felt were "provocative"—and his answers:

SELF-RELIANCE

Q.: For quite some years past, it has been stated that India is self-reliant in the entire nuclear fuel cycle and that very considerable expertise has been built up in this field. So far, however, that does not seem to have led to any substantial nuclear power generation. Why?

A.: To say that we are today completely self-reliant in the entire nuclear fuel cycle is no exaggeration. This fact was established when the first unit of the Madras atomic power station was commissioned about three years ago where 90% of the components were of Indian origin. The primary reason why this has not led to substantial nuclear power generation has to do with the nature of nuclear technology itself—it involves highly complex technology, needs heavy financial investments in the initial stages, and, above all, it has so far been a monopoly of a few developed countries who control the availability of components spare parts etc. It was inevitable that our initial steps would be slow. The post-1974 international situation also contributed significantly to the slow progress. In addition, the nuclear power projects, themselves, need relatively longer construction schedules. But with the commissioning of the MAPS units, we acquired the confidence to step up the nuclear power programme on a modest scale with the objective of increasing the contribution of nuclear power to the country's total electrical needs, from the present estimate of 2% to 3% to at least 10% by the turn of the century. In quantitative terms, there has been a steady growth in electricity generated by nuclear power stations during the past few years: from 3.5 billion units in 1983-'84 ot about 5 billion units in 1985-'86—a 50% increase in just two years.

LONG DELAYS

Q.: Several of our projects whether power stations or heavy water plants, have been beset with long delays, resulting in considerable escalation of costs. What are the causes of such delays? Are we overcoming them? With what success?

A.: It is a fact that completion of many of our earlier projects was significantly delayed in the past. In retrospect, one can also add that some of these delays could have been avoided. But the basic reason was that both the Central Department of Atomic Energy and the indigenous industry were in the learning stages of developing and assimilating this advanced technology — evolving designs, manufacturing methods, construction and commissioning procedures. This was compounded during the post-1974 years by the restriction imposed by foreign countries on export of some critical equipment to India. In addition, some of the delays were also due to the indigenous manufacturers not adhering to committed delivery schedules and, sometimes, quality. All these factors did lead to some unavoidable delays and escalation in project costs.

This experience has taught us

to take corrective steps in respect of future projects and these steps have shown results. The nuclear power project at Kakrapar is progressing on schedule and the heavy water projects at Thal-Vaishet and Manuguru are expected to meet their deadlines, if not improve on them.

Q.: Some academics charge that the massive investments in atomic energy have not yielded commensurate, even reasonable, returns. Is that correct?

A.: I would say that such statements do the academics no credit. Investments made in atomic energy over the years can be categorized into those made in public sector units, research and development and nuclear power. As for the public sector units, their performance has been satisfactory. Their annual balance-sheets and profit-and-loss statements speak for themselves.

But how does one measure "commensurate or reasonable returns" from investments made in research and development in the field of atomic energy or, for that matter, in any other R&D fled. The returns generally intangible by way of technology transfers or due to spin-offs into other fields due to advances in any one technology.

BARC GROUP

BARC has a technology transfer group which transfers proven technologies in different fields to other organizations for commercial use. A detailed analysis of this will surely show that the returns from investment in R&D have been much more than "commensurate or reasonable."

Coming to the nuclear power sector, the nuclear power stations are now earning significant revenues. During 1985-'86, the sale of electricity from the six nuclear power reactors (at Tarapur, Kota and Rajasthan) is estimated to have earned Rs 169 crores. This brings the total lifetime earnings to-date from these stations to more than Rs 754 crores, with an estimated Rs 170 to Rs 200 crores being added every year in the coming years. One can compare these figures with the final total project costs of these six power reactors which is about Rs 503 crores.

In addition, when one talks of returns, the conservation of such natural resources as coal or oil, which otherwise, would have to be consumed to generate electricity, is also an important aspect. For example, nuclear power has so far generated about 45 billion units of electricity which, if generated by thermal power stations, would have consumed more than 22 million tons of coal and 500 million litres of furnace oil.

UNSAFE

Q: The fear that nuclear power is unsafe at any cost is voiced strongly. The highly publicized Chernobyl disaster is bound to fuel such fears. Is that fear justified? There is also a view that it would be absurd and uneconomical to look for a guaranteed 100% safety in the area of unclear power generation, or any other hi-tech area.

A: Given the lack of credible sources of periodic and reliable inormation on the subject of nuclear power, radiation, etc. the general apprehension about this field is understandable. No doubt a small portion of the highly publicized, shrill and illogical fears are deliberately biased if not motivated and are, in themselves the cause of such apprehensions. One says this because of the unfair application of different standards for evaluating human safety Should not safety of human life be a prime factor, whichever type of incident is involved?. Despite the fact that a large number of casualties have resulted in recent times from catastrophic incidents in aviation, in the chemical industry, in mining, in rail transport, in the collaspe of dams etc., no one has taken up a crusade of safety in these areas, let alone calling for a halt to flying of aircraft, shutting down chemical plants, stopping travel by rail, halting of mining work or construction of hydel projects. But a Chernobyl is sufficient to cause worldwide questinoing about the safety of nuclear power. Why the double standards?

Let us look at facts. Until the Chernobyl incident, nuclear power stations could have claimed the unique distinction of not having had a single fatal nuclear-related accident during the course of almost 4,000 reactor years of experience. Nuclear technologists are fully aware of the hazards of radiation and it is, for this reason, the overriding parameter of safety combined with a design philosophy of "if such an event occurs, how to ensure safety", always form the design basis of nuclear reactors all over the world. Despite the recent incident at Chernobyl, one would iterate that nuclear power probably is the safest, cleanest and cheapest—in that order—source of electrical energy.

In nuclear technology, designers just do not stop with one safety feature. They assume all possible scenarios, and provide for backup systems even for the safety systems with what generally is known as fail-safe systems. Practically no other field, maybe with the exception of space and aviation, takes safety so seriously and even in these fields we are aware of what has happened in recent times. It is against the background of such design philosophy, safety norms, manufacturing methods, strict documented procedures for quality control, testing etc, that one says with conviction that nuclear power is safe.

Q: In sharp contrast to critics of the AEC, many are asking whether India is sufficiently developed in the nuclear field to cope with potential nuclear threats from you—know—where? Are we sufficiently well developed to counter such threats? What is your own perception of such a threat?

A: Taking the second question first, one would say that the perception of a nuclear threat to India obviously depends on many external factors. For example, the international situation regarding the arms race, progress in nuclear disarmament, the existence of nuclear weapory—in all its forms, irrespective of the country—close to our borders, and so on. An analysis of this also involves a political assessment. But speaking for ourselves, everyone is aware that India's nuclear programme is, at present, oriented towards the peaceful uses of atomic energy.

To begin with, this means nuclear power generation to meet the country's growing needs of electrical energy. In support of this objective, we are also carrying out several R & D activities in related fields so that the country is completely indigenous in all aspects of nuclear technology. The Prime Minister has made remarks in Parliament and elsewhere which are pertinent to your question and I do not have to elaborate on them.

Q: To return to power generation, the AEC projection of 10,000 MW of nuclear power by the year 2,000 is considered by some as not really adequate against the background of the growing demand for power. Cannot the nuclear sector, possibly, contribute more?

A: I would very much like that nuclear sector contributes more than the proposed target of 10,000 MW by the turn of the century for the simple reason that the country's demand for electricity during that period is going to be at least three times what it is now. However, our plans have been made on certain realistic assumptions about the availability of finances and manpower. Depending on the progress achieved by the 1990s, the department would naturally conduct a mid-term review to see whether nuclear power can make a higher contribution in the subsequent decades. The success of our long-term programme will, no doubt, depend on a firm commitment about availability of finances for this programme and the indigenous industry being assured of continuing orders for critical equipment so that promised delivery and project schedules are maintained. This, I think, will be the crucial factor affecting the success of our long-term nuclear power programme.

/13104
CSO: 5150/0153

INDIA

PEACE MARCHES CALL FOR END TO NUCLEAR ARMS

New Delhi PATRIOT in English 7 Aug 86 p 3

[Text] A number of peace marches and meetings were held in the Capital on Wednesday to mark the 41st anniversary of the first nuclear holocaust in Hiroshima, Japan.

Some 2,000 National Service Scheme volunteers from the various colleges of Delhi University took part in a peace march against nuclear weapons on the occasion. Their procession, which started from India Gate, ended at the UNDP office in Lodi Estate where they presented a memorandum against "the mindless race for annihilating the human race".

Chief Executive Councillor Jag Parvesh Chandra and the deputy chairperson of the Metropolitan Council were present on the occasion.

The Delhi Chapter of Bertrand Russell Study Forum led another peace march from the UPSC hall to the UN office in Lodi Estate. The marchers, including students from Springdales, Frank Anthony and Blue Bells Schools walked carrying placards and posters on peace and nuclear disarmament.

At a function organised by the Indian Federation of United Nations Associations, Minister of State for Communications Ram Niwas Mirdha said that only a very strong public opinion could influence the advocates of nuclear weapons. He appealed to all peace lovers to campaign against nuclear weapons.

The Committee for a Sane Nuclear Policy organised a panel discussion on Nuclear Proliferation and Arms Race at which Congress MP G G Swell said the world had two options on nuclear arms race. One is the Soviet proposal to de-escalate nuclear weapons by 35 per cent and to limit all nuclear testing to laboratores within the next 35 years. The other option, he said, was the US proposal to destroy the present nuclear stockpiles by 50 per cent and not deploy SDI weapons for another seven years.

Non-nuclear weapon nations could provide the cutting edge to the sword of moral offensiveness, said Mr Swell.

Pak envoy's denial: In his address, Pakistan's Ambassador to India Dr Humayun Khan said like India, Pakistan was committed to using nuclear energy only for peaceful purposes. He said Pakistan was not planning to go for nuclear weapons, also because it would have to pay a high price for doing so and would get little security in return.

Retired Justice V R Krishna Iyer said it should not be assumed that nuclear power was the only energy option available in the future but it should be only used as a last resort.

The Indo-Soviet Cultural Society also held a public meeting to observe Hisroshima Day and to support Indian and Soviet peace initiatives.

At a Hiroshima Day meeting organised by the Delhi State Committee of the Centre of Indian Trade Unions, solidarity was expressed with the struggle of the people of South Africa and Nicaragua.

/13104
CSO: 5150/0154

INDIA

MADRAS ATOMIC POWER STATION UNIT SYNCHRONIZED

New Delhi PATRIOT in English 4 Aug 86 p 5

[Text]

Madras, Aug 3 (UNI)—The 235 mw second unit of the Madras Atomic Power Station (MAPS) at Kalpakkam, near here, was sygchronised with the grid at 1000 hrs this morning, MAPS Director K S N Murthy told UNI here on trunk telephone.

The unit; which was taken off the grid on Wednesday last after the detection of malfunctioning of an electronically controlled valve, was now producing 110 mw, Mr Murthy said.

The power production would be raised to the rated capacity in phases, he added.

The unit was to have been recommissioned 38 hours after it was taken off the grid but some minor problems had delayed it.

Mr Murthy said start-up operations had begun on the 235 mw first unit, which was expected to be synchronised with the grid "very soon".

Meanwhile, the report of yesterday's leak of helium from the second unit of the MAPS has created a scare mong official circles and in Delhi.

Although the gas is neither radioactive nor toxic, MAPS authorities today received anxious calls from senior Central Government officials, the Pollution Control Board of the Tamilnadu Government, the Chengalpattu district revenue official and police officials, asking how the leak might affect public health.

MAPS officials told UNI that helium was a gas widely used in industries and many leaks in industrial undertakings had gone unnoticed.

The leak was plugged yesterday evening and the plant resumed power production this morning, the officials said.

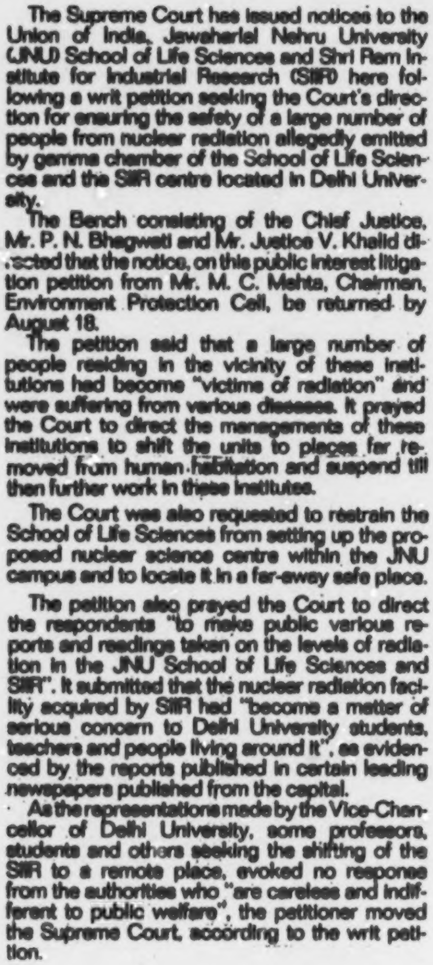
/13104
CSO: 5150/0152

INDIA

SUPREME COURT ISSUES WARNINGS ON NUCLEAR RADIATION

Madras THE HINDU in English 1 Aug 86 p 6

[Text]



The Supreme Court has issued notices to the Union of India, Jawaharlal Nehru University (JNU) School of Life Sciences and Shri Ram Institute for Industrial Research (SIIR) here following a writ petition seeking the Court's direction for ensuring the safety of a large number of people from nuclear radiation allegedly emitted by gamma chamber of the School of Life Sciences and the SIIR centre located in Delhi University.

The Bench consisting of the Chief Justice, Mr. P. N. Bhagwati and Mr. Justice V. Khalid directed that the notice, on this public interest litigation petition from Mr. M. C. Mehta, Chairman, Environment Protection Cell, be returned by August 18.

The petition said that a large number of people residing in the vicinity of these institutions had become "victims of radiation" and were suffering from various diseases. It prayed the Court to direct the managements of these institutions to shift the units to places far removed from human habitation and suspend till then further work in these institutes.

The Court was also requested to restrain the School of Life Sciences from setting up the proposed nuclear science centre within the JNU campus and to locate it in a far-away safe place.

The petition also prayed the Court to direct the respondents "to make public various reports and readings taken on the levels of radiation in the JNU School of Life Sciences and SIIR". It submitted that the nuclear radiation facility acquired by SIIR had "become a matter of serious concern to Delhi University students, teachers and people living around it", as evidenced by the reports published in certain leading newspapers published from the capital.

As the representations made by the Vice-Chancellor of Delhi University, some professors, students and others seeking the shifting of the SIIR to a remote place, evoked no response from the authorities who "are careless and indifferent to public welfare", the petitioner moved the Supreme Court, according to the writ petition.

/13104
CSO: 5150/0151

INDIA

SWEDISH GOVERNMENT APPROVES SALE OF ASEA HOT ISOTOPE PRESS

Stockholm SVENSKA DAGBLADET in Swedish 8 Aug 86 p 29

[Article": Asea Can Export Nuclear Technology"]

[Text] On Thursday the government gave Asea Metallurgy AB permission to export a hot isotope press to India. The technology can be used in producing nuclear weapons. This occurred even though India has not signed the nonproliferation agreement on nuclear technology and nuclear weapons and even though Swedish nuclear technology normally cannot be exported to countries that have not signed the agreement.

Scandiflash AB, on the other hand, was denied permission to export X-ray flash units precisely to India. The government justified this decision by saying that India had not signed the nonproliferation agreement.

"Signing the nonproliferation agreement is a minumum requirement when we examine the export of nuclear technology and decide whether or not to grant our permission for exports," section chief Gudrun Schollin-Ericson said.

9336
CSO: 5100/2566

INDIA

BRIEFS

BOMBAY ANTINUCLEAR DEMONSTRATION--Over 300 people led by college students held a solemn demonstration at Hutatma Chowk, (Flora Foundation) this morning to commemorate the 41st anniversary of the atomic destruction of Hiroshima and pledged to strengthen the peace movement to "free mankind from the nuclear threat hanging over the world." Huge banners proclaiming "no more Hiroshimas" and "ban all nuclear weapons" formed the backdrop to the specially erected stage. Hundreds of white balloons--symbols of peace--were released in the sky as anti-war slogans rent the air. Slogans raised were "down with Reagans Star Wars" "Down with scrapping of Salt agreement by American imperialism" by the demonstrators who held aloft a big poster caricaturing Reagan as a personification of nuclear evil. Lalit Chari, convenor of the ad-hoc committee for the commemoration of Hiroshima-Nagasaki, read out a pledge which in parts said "on this day during the UN international year of peace, we pledge ourselves to action, seeking to prevent any use of nuclear weapons anywhere by any state against another". The speakers included, Justice P B Sawant, A K Hangal and Dr Vivek Monteiro. [Text] [New Delhi PATRIOT in English 7 Aug 86 p 6] /13104

CSO: 5150/0155

BRIEFS

ISRAEL'S ALLEGED INTENTIONS REPORTED--According to a news item published in daily AL-ITTEHAD of UAE, Israel intends to destroy Pakistan nuclear installations. The paper quoted an Israeli newspaper as having said that to achieve this end, Israeli government has asked the Indian government secretly to sign an agreement for providing necessary services, including fuel to Israeli aircraft within Indian territory for the said purpose. The reaction of Indian government regarding Israeli request has not been known. [Text] [Karachi THE MUSLIM WORLD in English 16 Aug 86 p 1] /9274

CSO: 5100/4755

SOUTH AFRICA

ACCIDENT AT PELINDABA NUCLEAR PLANT REPORTED

MB081904 Moscow in Zulu to Southern Africa 1830 GMT 7 Aug 86

[Eugene Stebanov commentary]

[Text] Reports from South Africa say an awesome accident occurred at the Pelindaba nuclear plant. Two persons died and two others were seriously injured as a result of the inferno that broke out inside the plant's premises. Please listen to Eugene Stebanov's comment on this matter:

The accident at Pelindaba clearly demonstrated the need to apply stringent measures whenever nuclear research is conducted. This incident should remind us that the South African government is using all possible means to achieve independent nuclear capability and also that South Africa intends to make use of nuclear power to manufacture weapons of war.

On 22 September 1979 the U.S. satellite (?Beria) showed that atomic weapons had been tested in the south Atlantic Ocean. Since that time, the international community of nations, including African nations, have been watching Pretoria's nuclear development program with disapproval. The countries that have helped Pretoria with expertise to achieve nuclear capability are the United States, France, West Germany, and Israel. These countries are accomplices to the crime of the presence of nuclear weapons in Africa. African countries have protested vehemently at this development.

The Boers' access to atomic weapons poses a great danger to the world, especially to countries in the southern African subcontinent. There is a great danger that the South African apartheid regime will soon use these weapons against Southern African states. WEST AFRICA, a pamphlet published in London, says: The ongoing struggle for liberation in Southern Africa might spark an atomic attack on a neighboring country by South Africa. This would be in keeping with the often repeated South African military forays into these countries. The accident at Pelindaba killed two persons, but the accident that will result from South Africa using nuclear weapons against some country in the region will kill hundreds of thousands of people. Therefore, it is imperative that all those countries that strive for international peace join forces to eradicate nuclear weapons worldwide, including in South Africa.

/12913
CSO: 1812/159

FINLAND

LARGE-SCALE NUCLEAR SAFETY STUDY FOLLOWING CHERNOBYL ACCIDENT

Overpressure Preventers Demanded

Helsinki UUSI SUOMI in Finnish 30 Jul 86 pp 1, 20

[Text] The safety of Finland's nuclear power plants from serious accidents is being increased. The Radiation Safety Center has prevailed upon the power companies to design shields against excess pressure for their plants which would serve as a last resort in the event the reactor's protective housing should not withstand the pressure.

The Radiation Safety Center began to devote attention to preparedness for serious accidents even before the Chernobyl accident.

The Chernobyl incident will apparently result in more additional measures in Finland too. New safety recommendations will be decided on at the International Atomic Energy Agency (IAEA) conference to be held in Vienna at the end of next month.

"Reports on excess pressure shields and the filter systems that accompany them are still incomplete," plant manager Jussi Helske of IVO's [Imatra Power Company] Loviisa power plant said. It will be possible to build the devices in connection with the 1988 annual maintenance operation. Helske estimated that the cost of the project would be about 5 million markkas per power plant.

The system-like equipment that is to be installed in Finland's plants is in use at the Barseback power plant in Sweden.

Safety devices are being designed for nuclear power plants in operation in Finland to protect them against serious power plant accidents. The Radiation Safety Center has asked the power companies for plans for the construction of excess pressure shields for their plants.

"We began to devote attention to protection against serious accidents early this year, or before the power plant accident in Chernobyl," department head Jukka Laaksonen of the Radiation Safety Center said.

According to Laaksonen, the experiences they had in Chernobyl will also lead to new international safety recommendations that will be implemented in Finland as well.

The excess pressure shields now being designed for the plants in operation will mean devices that release any excess pressure that may be generated in the reactor dome, but nevertheless recover radioactive materials.

Excess pressure which the reactor's protective housing does not withstand may be produced, for example, during a reactor core meltdown in connection with serious accidents. The price of the excess pressure safety device is in the neighborhood of 5 million markkas per plant.

This sort of filter housing was built into the Barseback nuclear power plant operating in Sweden to reassure residents of Copenhagen 30 km from there and to ensure the granting of a license to operate. This equipment has at least not yet been required in other Swedish nuclear power plants.

The new international recommendations will be decided on at the end of next month. At that time IAEA experts will meet in Vienna to hear the Soviet report on the Chernobyl accident. Director Antti Vuorinen and Jukka Laaksonen of the Radiation Safety Center will participate in the Conference for Finland.

Nuclear Safety Study Ordered

Helsinki HELSINGIN SANOMAT in Finnish 3 Aug 86 pp 21-22

[Article by Arja Nukarinen: "What All Has Chernobyl Gotten Us to Study?"; first paragraph is HELSINGIN SANOMAT introduction]

[Text] We have hurriedly begun to investigate the difficulties of a nuclear power plant disaster. There is enough to keep us busy for the next year and millions of markkas will be sunk into research.

The Chernobyl power plant accident was a lotto win for science that had not been expected beforehand. After the accident, scientists realized that they were sitting between a huge testing ground and the materials. All possible benefit and information was extracted from the accident — and is still being and will continue to be extracted from it for years to come.

Up to now, they have in many cases been able to present only assumptions about radioactive radiation and radioactive materials. Now they are getting information by means of which the assumptions can be made more accurate and corrected.

We were in the same kind of situation once before, when radiation from nuclear tests conducted in the early 1960's reached Finland. At that time, however, the fallout was of a different kind and settled on the ground over a period of 4 years. This time all of the fallout reached us in May, according to what the investigators say. Scientists and other investigators had to work quickly.

At the Radiation Center they began to measure the amount of radiation a person might absorb through food, air or water and the possible dangers to health it might result in.

The Agricultural Research Center began to determine the radioactive materials that get into milk through livestock feed and how they get into food plants through the soil.

The National Health Institute started by measuring [radioactivity] in bogs and in addition began to study how long radioactive substances are retained in nature.

University researchers began to determine the effect of the fallout on timber stands, how it gets from grass into domestic animals and the effects it has on animal reproduction and the food chain in Lapland. At the universities they began to study the behavior of atmospheric particles, by means of which they determined how fallout can be used to advantage in research in scientific farming and forestry as well as in environmental studies. They studied [the effect of] radiation on butterflies and began a study of radioacitivity in birds.

At the State Technical Research Institute and the Customs Laboratory they began to check on radiation in export and import products.

Companies commissioned market and public opinion surveys by means of which they, among other things, measured Finns' attitudes toward nuclear power, officials in positions of trust's ability to deal with nuclear power plant accidents and their satisfaction with radiation reporting.

The Energy Policy Association, EVY [not further identified], hastened to do a quick study. According to it, Finland's nuclear power plants can be closed down without our having to immediately start rationing electricity. The outcome of the study was based on the assumption that Finns are now ready to voluntarily conserve electricity so that we can get rid of nuclear power. Studies are cutting across new studies helter skelter and they have not yet even begun to do anything. The work will go on for years and cost millions. Research institutes in the different sectors are participating in an enormous followup study on Chernobyl funded by the government. Most of the studies touch on the accident's effects on the environment, but underlying the work is an investigation of, for example, the reporting itself of nuclear power plant accidents.

In June the government appropriated a half a million markkas in emergency funds for research, which was provided for use by the Finnish Academy. More money is promised in next fall's supplementary budget and in the budgets of subsequent years. The institutes' funding prospects have risen to tens of millions of markkas. Education Ministry bureau chief Matti Lahdeoja estimated that they will probably get about 5 million markkas into the supplementary budget. He heads the committee that serves as an organ to maintain communications between the different ministries and the research institutes under their jurisdiction and makes funding proposals for Chernobyl studies.

No one is capable of estimating the number of research projects prompted by Chernobyl, nor can they be brought together in one spot. The Radiation Center bears the chief responsibility for the studies. Olli Paakkola, the head of the center's Monitoring Department laughed at the fact that there is not a library in all of Finland big enough to hold the results of all of the studies following the accident.

Since the end of April, they have had 16-to-18-hour workdays at the Radiation Safety Center Monitoring Department. The other important research institutes too, like the Meteorological Institute, the Agricultural Research Center, the Interior Ministry Rescue Department and the General Staff Safety Bureau, started working overtime soon after the day of the accident, 26 April.

Academy Operates at Record Speed

As early as May and June, the Finnish Academy decided to fund 10 scientific studies with a total of 687,300 markkas. The funds were used to take samples and for research assistants' salaries.

The Academy's Environmental Science Committee granted emergency funding for seven studies and the Agriculture and Forestry Committee for three. Prof Jouko Tuomisto, a member of the Environmental Science Committee, told us that the funds were granted at record speed. Applying for funds may take as long as 6 months, but this time it took only weeks.

Despite the Academy's promptness, many researchers had to start their work before the funding was decided on. They had to be able to take samples and study them with only a few days advance notice since radioactive iodine 131, for example, has a half-life of 8 days. The fact that few research institutes had the costly research equipment needed for the job also hampered the analysis of iodine.

The projects funded by the Academy are preliminary studies, the funding of which will expire at the end of the year. Further funding will be decided on after the end of they year when the researchers have presented the Academy with their interim report and continuation plan.

The Academy has granted funding to, among others, a joint committee for a study of the effects of the nuclear power plant accident which will try to tie together the Chernobyl studies. The committee's tasks and composition will not be decided on definitively until the fall, but Prof Pentti Kauranen of the University of Kuopio has already been invited to serve as chairman.

With the support of the Academy, they have begun three studies at the University of Helsinki and two in collaboration with the University of Kuopio. One study has been launched at Abo Academy.

The Academy has furthermore granted funds for a preliminary study to the Meteorological Institute, which is arranging for the handling of the materials produced by the Chernobyl incident and the samples as well as for followup observation.

With a grant provided by the Academy, university lecturer Antti Haapanen of the Environment Ministry is studying the biological effects of the nuclear power plant catastrophe on Finnish frogs. In May the Agricultural Research Center and the Radiation Safety Center observed the passage of radioactive substances from livestock feed to milk. Four cows were allowed to graze and the iodine, cesium and strontium contents of the milk they produced were calculated from day to day. Recommendations were made on the basis of the results because it was safe to let the cows out.

The radiation team formed at the Agricultural Research Center is preparing guidelines for agriculture in the event that what occurred in April should repeat itself. These guidelines are expected to be ready by the end of the year. With Academy funding, at the Research Center they are studying the passage of radioactive substances from the soil into food plants over a period of about 3 years.

In Kuopio university lecturer Matti Jantunen of the National Health Institute is directing a study of the half-lives of radioactive substances in a city environment. The initial results will be published at the end of the year, but the researchers have already noted to their surprise that the radionuclide, cesium 137, for example, does not appear to have passed on into anything after falling to earth.

The many bog studies have kept the National Health Institute and its partner in collaboration, the Radiation Safety Center, busy. Radioactive materials that fell on bogs, including peat bogs, were measured and, on the basis of measurements, the surface peat was skimmed off the tops of five bogs that produce peat for fuel. The results of the peat bog measurements and the fallout chart will be published after the summer vacation.

These studies will be continued next winter when the passage of radioactive fallout materials from burning peat into the air will be ovserved. We will obtain the results on the amounts of radionuclides, their behavior during burning and the amount released into the air in about a year. The same sort of study was made in the 1960's on pollutants produced in the testing of nuclear weapons. The study will also be extended to skimmed bogs, at which point we will see how much skimming has reduced the release of these materials into the air.

The National Health Institute is also studying the people who work on peat bogs, who have gotten to the point of worrying about their possible exposure to radiation. While consideration of the results is incomplete, they have noted that there are no very big problems.

Reporting Is Still a Problem

The Radiation Safety Center operates a little in every area — it performs tasks where and when they are necessary — but it mainly continues to struggle with millisieverts and becquerels. It is trying to find out how many millisieverts of radiation a person normally receives and how much he is now exposed to. It is reporting on becquerel levels in foodstuffs. On the basis of the results of the study, they urge people, for example, to continue to avoid eating fish caught in small lakes as a staple food more often than several times a week.

At the Radiation Safety Center they are studying rain, river, lake, sea and drinking water and observing [the effects of] direct radiation from the air and dust in the air. Dairy products, meat and grains are the most important foods from the standpoint of the measurements.

They are now also examining berries and mushrooms and some time from now fall grains. Before the hunting season, they will hold a test hunt at which time they will determine radiation levels in game. They have been observing radiation levels in deer killed in collisions throughout the entire summer. They have been continually taking measurements of fish, algae, vegetables, fruit, roots and grass.

The results are being compared with the data obtained from studies made in the 1960's and readings to be obtained on subsequent crops.

The job has been a huge one, since every study sample is thoroughly analyzed. For example, a complete radiation study on milk takes a full month, although data that provide indications are obtained as soon as in a few days time.

Department head Olli Paakkola said that the time for real decisions by leading scientists will not be until sometime in the future. The most important thing now is to determine how safe it is to eat our food.

"Through some of the studies we will determine what has to be done with contaminated food or land. If at some time there is a fallout 10 or 100 times greater than the one produced by Chernobyl, we must know how to act so that people will not unnecessarily be exposed to radiation. All of this kind of research results in knowledge pertaining exclusively to health," Olli Paakkola said.

In addition to these studies, the Radiation Safety Center has had to constantly disseminate information. Center employees have been answering people's uncertain questions since the end of April. They are constantly asking for exact radiation readings for specific areas. "It seems as if everyone expects that just his berry-picking preserve or fishing ground will be measured, and that's impossible."

During the first few weeks, reporting on Chernobyl was chaotic and reporting is still being investigated in collaboration with the Universities of Helsinki and Tampere.

In Tampere they are now reviewing newspaper reporting following the accident and its development. Later on, they will interview people so that they may determine how citizens' opinions have changed since the accident. A report on Finland's image in the world may be added as a third part of the study.

It is the University of Helsinki's job to determine how news about the accident circulated in the national government. They will try to make the initial results of the study public by the end of the year.

As for the Finnish Broadcasting Corporation, it is investigating its own reporting of the Chernobyl accident.

The investigators too are wondering how one should go about reporting [such] news. They feel that they are caught between two fires: Should all the news be reported immediately and, if it should, how should it be reported? There should be no errors, but measuring instruments too sometimes provide false readings.

The rise in radiation levels due to the Chernobyl accident was first observed in Finland at the Kajaani metering station. University lecturer Matti Jantunen said that they had at first suspected that the reason for the increased radiation levels was a local rise in radon levels. This is often the case in spring. They wanted to verify the fact before publicly releasing the information. Later on, officials were showered with invective for having kept the information secret.

When the stir over Chernobyl had already died down, word of high radiation readings in Kotka spread quickly throughout the world. The so-called Kotka barb proved to be a meter error. But officials had immediately released the report for publication and it created a stir in, for example, the United States. Department head Paakkola said that he had received phone calls from five U.S. television stations on that same day.

After the Kotka incident, there were at least two errors of the same sort in Finland, on which silence was maintained.

The effect on the United States was also visible in the market surveys that were conducted after the accident. Valio conducted its own survey on dairy product sales in the United States since the company's dairy product sales had plummeted in its biggest export country. According to the survey, over half of those who normally eat Finnish cheeses had decided to change brands or were hesitant about buying. The Kotka barb pricked a new hole in sales shortly after buyers on the other side of the Atlantic had been gotten to believe that Finnish cheeses could be eaten without fear. So far, Valio is not planning a new survey.

Among others, Finnair and the Tourism Promotion Center, which will have completed a precise report in the fall on tourism this summer, are conducting their own market surveys.

The Economic Survey Center for Agriculture follows the progress of dairy product sales and particularly buying patterns in the United States.

The accident has given rise to a large number of joint international studies. In the Nordic countries the NKA (Nordic Contact Agency for Atomic Energy Issues) is conducting studies. Chernobyl has already been discussed at several international congresses and new ones will continue to be organized 5 and even 10 years from now. Among others, the IAEA and the World Health Organization (WHO), whose European office is gathering information chiefly on studies that have been conducted on the effects [of the accident] on people's health, are launching their own studies and reports.

Together with WHO, the UN committee, UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation), which is studying the effects of radioactive radiation, is publishing the most comprehensive and important written report. The report will be completed in a year's time at the earliest.

Forest Death Tie Asserted

Helsinki HELSINGIN SANOMAT in Finnish 3 Aug 86 p 22

[Article by Jouni Tulonen: "Is Nuclear Power Accelerating the Destruction of Forests? Prof Erkki Lahde Urges That the Condition of the Trees in the Neighborhood of Loviisa and Olkiluoto Be Studied"]

[Text] The Chernobyl catastrophe demonstrated that a serious nuclear power plant accident can occur wherever and whenever. While the nuclear power industry can no longer advertise nuclear power as an absolutely safe form of energy, this at least demonstrates more cogently than before that a normally operating nuclear power plant generates really clean electricity that is kind to the environment.

In Central Europe, however, since the 1980's there have been disputed studies according to which nuclear power, even in normal use, is one cause of the alarming destruction of forests. The West German scientist, Gunther Reichelt, was the first to notice that in the Federal Republic there were noticeably more damaged trees in the proximity of some nuclear power plants and uranium mines than in the charted area in general. According to Reichelt, there was no other industry worth noting in the areas under study that could have caused the damage.

A particularly interesting discovery was the fact that most of the damaged trees were at those points of the compass toward which the prevailing winds blew. They believed that this indicated that radioactive discharges from nuclear power plants moving with the wind might actually accelerate the death of the forests. Later, in both Switzerland and France they conducted the same kind of studies, the results of which supported Reichelt's observations.

Reichelt's studies have been sharply criticized in the Federal Republic; among other things, his method for charting forest damage is regarded as questionable. It has also been pointed out that he was unable to sufficiently well eliminate the importance of other air pollutants and especially of pollutant fallout coming from a distance in his studies. The nuclear power industry, which has constantly stressed the fact that nuclear power is an alternative to coal-burning power plants which cause forest deaths, has naturally reacted particularly vehemently to this.

At any rate, the German studies have, among other things, caused a scholar at the University of Lund to urge that a study be made of the condition of the forests surrounding Sweden's nuclear power plants. Prof Erkki Lahde of the Forest Research Institute considers the observations made in Central Europe to be interesting enough for there to be reason to set in motion a similar study in Finland too.

"Several Central European nuclear power plants and uranium mines are located in the middle of common forest areas, which makes them very appropriate candidates for this kind of study. Both the Loviisa and Olkiluoto nuclear power plants are on the coast and it is more difficult to determine their effect on the forests. The study should be planned very carefully so that the evidence does not have the power to influence people in one direction or another."

According to Lahde, the most important thing is to find comparable areas in which all the known air pollutants are the same as in the Loviisa and Olkiluoto forest areas. By comparing the condition of the trees, it can be determined whether, specifically, nuclear power plants really constitute some sort of hazard to the forest.

"Someone ought to take the initiative with this kind of study. It would be very suited to the Feature [possible typo for ilma 'air, atmosphere, image'] Project funded by the Environment Ministry and the Agriculture and Forestry Ministry, in which they are in general studying the effect of air pollutants on Finland's forests. Obviously, it will be hard to get funding for such a sensitive research subject," Lahde said.

Radioactivity Does Not Have a Direct Effect

Nuclear power experts dispute the results of Reichelt and his colleagues' study because the annual radioactive discharges reported for nuclear power plants are so small in comparison with nature's own background radiation that they cannot have any effect on forests.

As for Reichelt, along with physicist Roland Kollert, he has attempted to prove that radioactive discharges strengthen the effect of, for example, sulphur and nitrogen pollutants even though they do not directly damage trees. According to them, nuclear power plants are one link in a chain that is strangling the forests of Central Europe.

In a recent book, Reichelt and Kollert maintain that occasionally — for example, in connection with the switching on and off of plants — radiation levels clearly rise for short periods of time, although annual radiation levels are indeed low.

These "radiation peaks" and natural radiation may together over a long period of time serve as a threshold factor that triggers illness in trees taxed by other pollutants.

In laboratory experiments it has been noted that radioactive radiation ionizes the air and changes the composition and electrical charge of chemical compounds, air pollutants, for example. Pollutants then more easily than before affect the trees' needles and stop their chlorophyll production.

The elements also react sensitively to one another, thereby giving rise to new compounds that are more damaging than before. These are, for example, the so-called free radicals which have been proven to be more destructive than, for example, sulphur dioxide.

The big power transmission lines also ionize the air, which probably plays a role in the damages that have been ovserved in forests in proximity to nuclear power plants. Also, ozone is generated around power lines, the increase of which in the lowest layer of the atmosphere a new study views as one important cause of the destruction of forests. According to Reichelt and Kollert, what is involved is the combined effect of very many individual factors.

In Finland both the representatives of the nuclear power industry and radiation safety officials regard "peak theories" as being unfounded. According to them, discharges do not even for short periods of time increase to such a level that they might damage forests in one way or another.

Chief inspector Raimo Hentela of the Radiation Safety Center matter-of-factly asserted that there is no need in Finland for studies of forests in the proximity of nuclear power plants.

We Don't Know Everything There Is to Know About Nuclear Power

Prof Erkki Lahde does not believe that the "absolutely certain scientific knowledge" palmed off on us by the nuclear power experts is necessarily the final word on nuclear power.

"Nuclear power plant accidents and problems with the storage of waste materials demonstrate that the process is not entirely under control. I also think that it is quite possible that a nuclear power plant may release so little radiation that we are incapable of even measuring it with current methods, but which may have an effect on the natural environment. It is naive of us to believe that science is all-powerful and all-knowing in this area either."

Helsinki University professor of environmental protection Pekka Nuorteva thinks that the observations in connection with nuclear power and forest deaths are interesting. According to him, the importance of the observations is, nevertheless, more theoretical than practical. Investigators are now concentrating on determining how radiation in general — and in particular sunlight — changes the usual air pollutants.

"The use of fossil fuels is still the most important single cause of the destruction of forests and nuclear power will certainly be publicized as the savior of Europe's forests in future as well.

"For conservationists the choice between nuclear power and, for example, coal is the same as the choice between the plague and cholera. While sulphur discharges destroy forests directly, radioactive discharges affect genes, which preserve the whole natural economy," Nuorteva said.

Since radioactive discharges affect hereditary factors slowly and over a broad spectrum, the effects on statistics are easily lost. This does not, however, mean that there are none. The knowledge gained from the study of the longterm effects of radioactive radiation per se is relatively scanty so far.

Attention has been devoted to, among other things, how certain radioactive elements behave in the human body. For example, it has been noted that tritium in the organs of the body is transformed into helium, which breaks up the DNA chains of the genes. There is noticeably more tritium in nuclear power plant discharges than in natural radiation.

11,466
CSO: 5100/2563

SPAIN

BRIEFS

NUCLEAR WEAPON PRODUCTION REPORTED--Air Force Brigadier General Jose Maria Salas Larrazabal affirmed yesterday at the La Granda summer courses in Aviles that Spain is on the verge of producing its own atomic bombs. Salas Larrazabal said that "only the consent of the highest military authorities is needed" for Spain to begin producing this type of weapon. [Text] [Madrid DIARIO 16 in Spanish 1 Aug 86 p 8] /8309

CSO: 5100/2567

SWEDEN

NUCLEAR REGULATORY AGENCY: COUNTRY COULD HANDLE MELTDOWN

Stockholm DAGENS NYHETER in Swedish 11 Aug 86 p 14

[Article by Bo Emanuelsson]

[Text] Personnel at Swedish nuclear power plants have 10 hours to deal with a meltdown. This is how long the Nuclear Power Inspection Board (SKI) estimates that the containments will hold before 0.1 percent of the nuclear reactors' radioactive cesium and iodine will leak out to the environment.

This was stated by Lars Hogberg, acting director general of SKI, in an interview with TT (TIDNINGARNAS TELEGRAMBYRA).

"The fear of a major nuclear accident is justified, but we should not conclude from this that every little leak and every crack will automatically lead to a serious accident. There is a tendency to overdramatize the situation," Lars Hogberg said.

During the 10 hours, the radioactive core must be cooled by the existing water system, which will be improved, at Swedish nuclear power plants.

SKI does not believe, however, that any improvements are needed at Barseback 1 and 2, but that the filter that is installed there will deal with the radioactive substances during the critical 10-hour period.

"But if emissions exceed 0.1 percent, then the situation will be much worse," Lars Hogberg said.

More Cancer Cases

Even if no one dies from acute radiation sickness when emissions reach 0.1 percent, the number of cancer cases would increase. In addition, even a 0.1-percent emission would mean that small amounts of land would be unusable.

"We must be prepared to accept minor emissions in order to save the reactor containment. It would be much worse if the containment were to burst," Lars Hogberg said.

He added:

"The minor faults that occur constantly do not result in safety problems, but primarily in operational problems and radiation exposure for people who repair leaks and cracks."

"Before there is major damage to a pipe, there is a small leak that we can detect and repair."

23 Shutdowns

According to the quarterly report from SKI, during the first quarter of this year reactors were shut down as a result of major or minor problems a total of 23 times at the 11 Swedish nuclear reactors. The greatest number occurred at Barseback 1 and 2, with four and three shutdowns, respectively. There were four shutdowns at Forsmark 3 and three at Oskarshamn 1.

In addition, operation was disrupted, without shutdown, on 15 occasions and, finally, reactor power was reduced 16 times as a result of monitoring at various facilities.

"The most important aspects of this work are constant supervision, monitoring, and prevention. Most problems can be detected at an early stage with the existing safety system. The 'only' problem is to make sure that this work never becomes routine," Lars Hogberg said.

He admits, however, that even leaks and cracks that are plugged and repaired can become a safety hazard. This could occur if there are so many repairs that faults develop in the material or that the reactor becomes almost unusable. This was the reasoning behind the decision to replace the steam generator at Ringhals 2, at a cost of 1.2 billion kronor.

"It is best for the reactor to be as safe as possible during the remainder of its lifetime, whether that will be 4 years or 24 years. Safety cannot be measured in terms of money. This is the philosophy behind the Swedish nuclear power program," Lars Hogberg said.

No Predictions

Since nuclear power was introduced in Sweden in earnest during the early 1970's, with the opening of Oskarshamn 1 in 1972, the experts have changed their opinion several times and have detected problems they never believed could occur. As a result, SKI makes no predictions concerning reactor safety for periods longer than 3 to 5 years. No too long ago, it was claimed that the reactors had a lifetime of 40 years.

The problems that have occurred that had to be repaired include stress corrosion at Ringhals 1. As a result, 260 meters of pipe had to be replaced. Another problem has been and continues to be leakage in pipes at Ringhals 2. As a result, so many pipes have been repaired that the reactor must operate at reduced power until the steam generator is replaced.

Brittle Vessel

The greatest problem at Oskarshamn 1 has been embrittlement of the reactor vessel. In addition, the containments at all reactors except Barseback 1 and 2 must be provided with better protection against meltdown. The problems are greatest at the newer boiling-water reactors at Forsmark 1-3 and Oskarshamn 3.

"Before the meltdown at Three Mile Island near Harrisburg, no one believed there could be a meltdown. All the safety work was directed toward preventing a meltdown and repairing major damage to pipes," Lars Hogberg said.

Safety work was guided by the so-called Rasmussen Study of 1975, according to which a meltdown was so extremely improbable as to be negligible. Forsmark 1 and 3 and Oskarshamn 3 were built with this principle in mind. After Harrisburg, nuclear power experts had to change their way of thinking and after the accident at Chernobyl, the effort to protect the containments has been accelerated, so that it will be complete in 1988 instead of 1989.

"We have been unable to make any safety calculations," Lars Hogberg said. Nevertheless, such calculations may be found in the SKI publication Svara Karnkraftsolyckor (Major Nuclear Accidents), which presents guidelines for reinforcing the containments. This publication states:

"The requirements do not apply to events of extremely low probability. This means major ruptures in the reactor vessel."

"We are not making calculations with figures, but we can simply state that the containments cannot withstand a major rupture in the vessel. Consequently, all work must be directed toward monitoring the reactor vessel so that weak parts may be detected and replaced," Lars Hogberg said. The radiation in the vessel alters the vessel material.

"There are no indications, however, that this represents any major problem at Swedish nuclear power plants where we have both good original material and a good monitoring program. But we are keeping a close eye on the oldest reactor, Oskarshamn 1," Lars Hogberg said.

But the SKI quarterly report mentions an accident that "normally should not occur."

In February there was an "explosive ignition at the Studsvik incinerator," where uranium-containing residual products are burned. The report indicates that SKI feared there had been personal injury and radioactive emissions. The explosion itself was called a "breakdown with consequences for safety." No one was injured, however, and according to the report the emissions were "insignificant." Operations at the incinerator facility started up again 11 days after the accident.

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CSO: 5100/2566

SWEDEN

SAFETY WORK ON REACTORS SPEEDED UP FOLLOWING CHERNOBYL

Helsinki HELSINGIN SANOMAT in Finnish 3 Aug 86 p 18

[Text] Stockholm (TT)--Improvements on the protective structures of Sweden's nuclear power plants are taking place faster than planned. The goal is to be able to keep radioactive material inside the protective housing in the event of the worst possible nuclear power plant accident imaginable -- a reactor core meltdown.

Before the accident that occurred at the Soviet nuclear power plant in Chernobyl, the goal was to have the improvements completed by the end of 1989. After the Chernobyl accident, however, the government demanded of the nuclear power plants that they get the repairs on the protective structures done by the end of 1988.

Acting general manager of the Swedish Nuclear Power Inspection Office (SKI) Lars Hogberg told the TT [Tidningarnas Telegrambyra] news agency this weekend that they will have filled the protective housings with water at the two Swedish nuclear power plants which require the most improvement, Oskarshamn 3 and Forsmark 3, as early as this summer.

The Forsmark 1 and 2 protective housings can be temporarily filled with water. Hogberg added that the work to improve the Oskarshamn 3 and Forsmark 3 protective housings is not finished, but that the most important improvements will be done this summer.

In the report, "Difficult Nuclear Power Plant Accidents," dated in February, the SKI points out that a great deal has indeed been done to improve the safety of Swedish nuclear power plants, but that the possibility of a core meltdown cannot be excluded.

Hogberg said that they did not take a reactor core meltdown into consideration until after the accident that occurred at the U.S. Three Mile Island power plant. He added that after the Chernobyl accident it became more and more timely to be concerned over whether the protective housings would withstand the strain in the event of a major accident.

The possibility of a reactor core meltdown cannot be eliminated despite all the safety measures.

11,466
CSO: 5100/2563

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JPRS-TND-86-021

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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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NUCLEAR DEVELOPMENT AND PROLIFERATION

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CAPABILITY OF DAYA BAY TO HANDLE 'WORST CASE SCENARIO' DISCUSSED

HK310354 Hong Kong SUNDAY STANDARD in English 31 Aug 86 p 7

["Edited version of Part V, titled 'Observations'" from report by Legislative Council nuclear Fact-Finding Missions to the United States, Europe, and Japan]

[Text] General Observations

According to the information provided by experts from France, the United States, Japan, and the International Atomic Energy Agency (IAEA) during the fact-finding trips, the following observations were made:

1. The PWR (Pressurised-Water Reactor) type reactor, as is proposed for Daya Bay, is designed and will be constructed in such a way that even in the event of a worst accident resulting in a core melt-down, the containment building will be able to contain most of the radioactive products.

2. The emergency planning required to be done to prepare for a worst accident will be: a) possible evacuation within a radius of 10 km, adopted in France and Japan, or 10 miles as is required in the United States; b) contingency action on food and water to be taken within a radius of 50 km (50 miles in the United States) from the nuclear plant.

3. It is highly unlikely that an accident like the one that took place at the Chernobyl RBMK nuclear power plant would happen to a PWR.

4. An additional safety feature has been developed and adopted by France and other countries for modification of existing plants to reduce the build-up of pressure to a safe level, where necessary, inside the containment building in case of a severe accident.

This is done by means of a controlled sand filter system, the usefulness of which is recognised by the IAEA.

5. All improvements developed for control room design as a result of the Three Mile Island accident have been incorporated in the design for the Daya Bay plant.

6. The question of metal fatigue affecting the material used for the reactor pressure vessel has been resolved.

7. The cost of nuclear power varies from country to country and while in other countries the average cost of nuclear generated power is cheaper than coal-fired generated power, in the United States nuclear-generated power is more expensive than coal-fired generated power.

8. The safety of a nuclear power plant depends to a great extent on safe operation by a well-trained operation crew. In France, the United States and Japan operators are licensed by the regulatory authority of the country.

The operation crew undergo frequent periodical retraining to refresh them on emergency procedures and heighten their emergency response capability.

9. In the United States, near-site and off site emergency response services centres are set up by the nuclear power companies to give technical support to the operation crew in case of an emergency.

A clear line of communication is set up and there is a clear chain of command to ensure that an emergency is handled properly.

10. All nuclear power plants visited by the delegations are security tight. Access and exit of all persons must be authorised and are computer controlled and recorded. Site boundaries are monitored by closed circuit cameras and stringent precautions are taken against sabotage.

11. The relationship between utility companies, the government and the public in the countries visited are very open. General information about nuclear energy and the design and operation of nuclear power plants is made easily available. The public participates in public hearings, visits the plants and gets involved in emergency planning.

Observation for the Consideration of the Chinese Government and the Guangdong Nuclear Power Joint Venture Company

It has to be stated that it is recognised that the decision to build or not to build a nuclear power plant at Daya Bay lies within the jurisdiction of the Chinese government and we fully recongise the deep concern of the Hong Kong people over the safety, management and operation aspects of the plant.

If a nuclear power plant is to be built at Daya Bay, the following observations are for the consideration of the Chinese government and the Guangdong Nuclear Power Joint Venture Company (GNPJVC).

Design and Construction

1. To incorporate the sand filter system into the containment building design so as to further increase the safety features of the containment building at the highest level under condition of high-pressure build-up.

2. To incorporate a hydrogen recombiner system so as to reduce the probably danger of high level hydrogen concentration, thereby avoiding the possibility of hydrogen combustion.

3. To incorporate pressurised containment penetration design onto the penetration sleeves of those pipes that have to penetrate through the containment building. The incorporation of this feature would help to prevent any leak of air from inside the containment to other areas.

4. To establish an emergency response facilities centre within the site boundary but isolated from the plant, where technical support and command control can be given during emergency.

5. To ensure that the nuclear island (reactor building) is so constructed as to avoid contamination of underground water in case of a severe accident.

6. To ensure, during the construction stage, stringent quality control, and to make use of the IAEA Pre-Operational Safety Review Team's (Pre OSART) visit to to Daya Bay.

Accidents and Emergency Planning

1. To set up a national incident response headquarters to give support to the nuclear plants at Daya Bay and elsewhere in the event of incidents, and to consider direct access to the computer data links to be offered by Electricite de France.

2. To establish an effective and independent communication system, including direct telephone lines and back-up facilities for communication during emergencies between the Daya Bay Plant, the Chinese nuclear safety authorities and the Hong Kong Government.

3. To use a single, consolidated instruction manual for plant operation, specifying clearly the chain of command and operational steps in the event of an accident or an emergency warranting a shutdown.

4. To join the IAEA convention on early notification of a nuclear accident and the convention on assistance in the case of a nuclear accident or radiological energency.

5. To draw up comprehensive and well-coordinated emergency plans for the safety of the people living in the close vicinity (10 km by French standard, 10 miles by U.S. standard, and 8-10 km by Japanese standard) of the Daya Bay plant

6. To enter cross boundary agreements with Hong Kong on the exchange of information and coordination of contingency planning.

Central Management

1. To take up a further technical assistance contract with Electricite de France after commissioning and during the life span of the Daya Bay Plant.

2. To delineate clearly the sphere of responsibilities between the government ministries and agencies for management and regulatory control of nuclear plants so as to ensure that there are checks and balances.

3. To establish an independent advisory body for nuclear safety and nuclear regulatory control with Hong Kong participation and to draw on the knowledge and experience of experts from the IAEA, France, the United States and Japan.

4. To set up an independent inspectorate to inspect the nuclear plants to ensure that safety standards are maintained and safety regulations are enforced.

Plant Management and Training

1. To provide for Hong Kong Nuclear Investment Company's (HKNIC) participation in the management of the Daya Bay Plant for the life span of the plant? [question mark as published]

2. To develop a system of regular inspection and maintenance for the Daya Bay nuclear power plant to secure operational quality assurance.

3. To institute regular training and retraining to heighten the operating crew's awareness of safety and preparedness for responding to emergencies (in the case of the United States, operators are required to attend a week of simulator room retraining for every 4 to 6 weeks of normal work).

4. To make use of the IAEA Operational Safety Review Team's (OSART) visits to Daya Bay after commissioning.

5. To work out and maintain tight security at Daya Bay for the protection of the plant and facilities from sabotage.

Environmental Safety

1. To set up a comprehensive and effective system of monitoring stations for monitoring radiation.

2. To study the possibilities of atmospheric dispersion of radionuclides affecting the food chain and sources of water supply to the surrounding areas including Hong Kong and draw up remedial measures if contamination occurs.

3. To draw on the knowledge and experience for disposal of nuclear waste from such countries as France, the United States and Japan which have done advanced research into this problem.

International Arrangements

1. To make the most of all IAEA assistance in training, inspection mission and regulatory advice and adopting, to start with, the IAEA safety requirements criteria as set out in the Nuclear Safety Standards (NUSS).

Public Education and Information

1. To urge the GNP JVC to play an active role, as in the case of utility companies in France, the United States and Japan, in educating the public about nuclear energy in general and the Daya Bay Plant in particular.

2. To require Framatome to explain to the public the design of the Daya Bay Plant and how the safety features could counter the maximum credible accidents.

3. To make available as much information as possible to the Hong Kong public about the construction, quality, precautions taken of the plant and to set up a public enquiry bureau to facilitate better understanding.

4. To make public the safety analysis reports prepared by the Electricite de France when it is completed.

Economic Aspects

The economic efficiency of nuclear power is multi-factoral and varies from country to country, and we cannot make an assessment on whether there are economic benefits to China in building the Daya Bay nuclear power plant or not.

Nevertheless, we wish to be ensured that the future electricity tariff being charged to the people of Hong Kong will not be higher than the tariff charged by the Hong Kong power companies for the life span of the Daya Bay nuclear power plant.

Observations for the Consideration of the Hong Kong Government and the Hong Kong Nuclear Investment Company

The following observations are for the consideration of the Hong Kong Government and the Hong Kong Nuclear Investment Company (HKNIC):

Contingency Planning

1. A contingency plan should be drawn up for those areas which lie within 50 km (50 miles by U.S. standard) from the Daya Bay Plant for protective measures in the event of radiological releases affecting Hong Kong.

2. Protective measures should be planned against the contamination of water supply, vegetables and other food and dairy products.

3. A government committee should be set up for the preparation of contingency plans.

Cross Boundary Agreement

1. Cross-boundary agreement should be made with China to enable Hong Kong to monitor radioactivity at close range of the Daya Bay Plant, to exchange information and to coordinate contingency planning for Hong Kong.

Public Information

1. The Hong Kong Government should strengthen her public information programme to make available information about nuclear energy and the effects of radiation.

2. The HKNIC and China Light and Power should introduce a public information programme and disseminate to the public information with regard to nuclear power. An information bureau should be set up to answer questions from the public.

Advisory Committee

1. The Hong Kong Government should set up an independent advisory committee to advise on matters related to nuclear energy.

IAEA Membership

1. To establish international links with nuclear safety agencies and to obtain information and advice on nuclear safety, the Hong Kong Government should consider Hong Kong's membership in the IAEA.

Atomic Industry Forum Membership

1. HKNIC should consider joining the Atomic Industry Forum, which is a U.S. nationwide as well as an international organisation, to obtain formation exchange on, and technical support for, the nuclear industry.

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CSO: 5100/10

HONG KONG TO GET NUCLEAR ACCIDENT PLAN BEFORE DAYA BAY OPENS

HK300416 Hong Kong SOUTH CHINA MORNING POST in English 30 Aug 86 p 1

[Report by Albert Chaw]

[Excerpts] Hong Kong will have a nuclear accident survival plan in place by 1991--about a year before Daya Bay nuclear plant is due to be commissioned.

The government will then begin conducting regular exercises and drills to test the efficiency of the disaster plan and to ensure that Hong Kong is ready to cope with any nuclear mishap by the time the power station opens.

The timetable for the introduction of emergency procedures was disclosed by Principal Assistant Secretary of the Economic Services Branch Mr John Wilson, who is the "Daya Bay man" within the government.

His branch is the overall liaison and policy centre within the government which is handling the controversial issue.

Mr Wilson was in the branch working closely with the former economic services secretary, Mr Piers Jacobs, back in 1983 and 1984 when the government and the Executive Council gave the go-ahead for the project.

He recently returned to the section as the nuclear safety issue intensified after the Chernobyl accident.

During a recent trip to Britain, Mr Wilson and two other government officials met experts of the United Kingdom Atomic Nuclear Authority (UKAEA) to discuss the contingency planning report now being compiled by the authority.

The report, to be ready before the end of this year, will contain only proposals for emergency planning, Mr Wilson said.

Actual safety and emergency arrangements will be mapped out by the government based on the report's recommendations.

One of the these recommendations will be for the Hong Kong Government to set up an emergency task force within the administration to cope with any mishap.

UDAEA experts also advised the government to have regular drills for officials in this task force so that they could be activated immediately after an accident occurred.

This suggestion was put to a Hong Kong Government delegation during their recent visit to Britain to meet USAEA experts based in Harwell.

The Hong Kong delegation comprised Mr Wilson, Mr Graham Osborne, director of Electrical and Mechanical Services Department, and Dr M.C. Wong, who is in charge of radiation monitoring at the Royal Observatory.

UKAEA officials agreed to a request from delegates to write the report in Layman's terms, so that the public could understand.

The Hong Kong delegation also spoke to another group of UKAEA experts at Culcheth who are compiling the phase two report of accident assessment on the Daya Bay nuclear station.

The earlier phase one report, which was confidential but leaked to the media, caused considerable controversy, especially the part dealing with the probability of a serious accident.

It highlighted the unlikelihood of an accident--and was released before the Chernobyl disaster.

Mr Wilson said yesterday the issue of accident probability was brought up in the discussion with the experts, who told the Hong Kong officials they stood by their study.

But the second phase report, at the request of the Hong Kong Government, will include consideration of Chernobyl.

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CSO: 5100/10

HONG KONG

CONTRACTS ON DAYA BAY TO BE SIGNED IN SEPTEMBER

HK300645 Hong Kong HONG KONG STANDARD in English 30 Aug 86 p 1

[Report by David Wong and Li Wing-on]

[Text] Signing of the major contracts for the Daya Bay nuclear power plant will take place on 24 or 25 September, reliable sources tole THE STANDARD yesterday.

The venue of the signing ceremony will be Shenzhen where the plant's headquarters are located, not Beijing as reported earlier.

The decision on the contract-signing date was made by top Chinese officials working on the project under the leadership of Vice Premier Mr Li Peng.

It is understood the Hong Kong Government was also informed of the decision a few days ago.

Sources said all preparations for the mammoth project have been completed, and the infrastructure is ready for the works to start once the green light is given after the signing of the formal contracts with both French and British suppliers.

A source told THE STANDARD that Shenzhen was chosen as the venue for signing the contract because most of the negotiations for the project took place there, though the signing of the letters of intent was held in Beijing.

However, it is not yet known who will take part in signing the formal contracts.

The indications are that the chairman of the Guangdong Nuclear Power Joint Venture Company, Mr Wang Quanguo, will probably represent the Chinese side to sign the multi-billion dollars project.

According to the classified company document seen by THE STANDARD, it is planned to take 78 months to construct the plant after formal contracts are signed on the supply of the nuclear facilities.

Site formation and other infrastructure facilities including a road network and reservoirs have been completed.

"The official stand on the construction is to strive to finish the construction in 6 years, but it must not be more than 7 years," the document read.

Meanwhile, the full report of the Legco [Legislative Council] fact-finding missions to nuclear plants in the United States, Europe, and Japan will be made public today.

Councillors will be receiving a copy each in the morning while copies will be made available to the press in the afternoon together with a statement issued by members who have joined the tours.

The scheduled publication of the report will pave the way for next Wednesday's extraordinary in-house meeting of the Legco members who will probably have a heated debate on whether the council should call for a special open session to discuss the issue.

The legislature is at present in summer recess.

There has been angry exchanges between two camps. Those with reservations about Daya Bay have identified themselves with firm opponents of the project, Mr Martin Lee and Dr Conrad Lam.

Their target has been to press for the quick release of the reports of the Legco nuclear fact-finding missions abroad.

And in doing so, the two, especially Mr Martin Lee have had heated exchanges with mission leaders Allen Lee and Maria Tam.

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CSO: 5100/10

CANADIAN SYSTEM TO CURB RUNAWAY REACTOR OUTLINED TO SOVIETS

Ottawa THE WEEKEND CITIZEN in English 30 Aug 86 p A6

[Text]

VIENNA — Steps to prevent another Chernobyl-scale nuclear disaster may include a fast shutdown system modelled on the one developed after a reactor accident at Chalk River in 1952.

This "very fast and powerful system" and Ontario's nuclear-emergency response plan were outlined at a private meeting of Canadian and Soviet representatives Friday.

Rudolf Rometsch, the president of the Swiss Nuclear-Waste Association, said the Soviet reactor at Chernobyl went from seven per cent of its capacity to "a hundred-times its nominal value in less than a second and the power plant was destroyed in the following four seconds." He chaired the review in Vienna this week of the April 26 accident at the Chernobyl reactor in the Soviet Union.

The Canadian system to curb such a runaway reactor responds in less than two seconds and is tested once every shift at nuclear power stations in Ontario, Quebec and New Brunswick, the Canadian delegates said.

"I mentioned our system to the Soviets because the NRX accident (at Chalk River), while on a much smaller scale, had some similarities to Chernobyl," said Gordon Brooks, the vice-president and chief engineer of Atomic Energy of Canada Ltd.

Canadian experts said they want the fallout from the Chernobyl reactor disaster to include exchanges of nuclear science and safety procedures with the Soviet Union.

"We're trying to establish working-level contacts with them," said Ron Thomas, a science counsellor at the Canadian embassy in Vienna, after the lunch meeting with Soviet nuclear experts.

Brooks said exchanges might be useful in two areas; operating procedures and the chemistry of zirconium alloy pressure tubes, which are common to both the Chernobyl-type Soviet RMBK and Canadian Candu reactors.

Soviet scientists at the Vienna conference told Farroukh Ali, Ontario's nuclear-emergency planner, they wouldn't begin to consider evacuation during a nuclear accident until radiation is likely to be above 25 rems (units of radiation exposure) and it is not mandatory unless a level of 75 rems is reached.

In Ontario, people within 10 kilometres of a nuclear station would be evacuated if radiation of between one and 10 rems was predicted.

/9274
CSO: 5120/49

BRIEFS

URANIUM EXPORTS--Canada still ranks as the world's leading producer and exporter of uranium, according to the annual assessment of the country's uranium supply released Wednesday by the Energy Department. At the end of 1985, total recoverable resources in the measured, indicated and inferred categories were estimated at 545,000 tonnes of uranium, down slightly from 551,000 tonnes reported for 1985. The most significant change from 1984 is a 19-per-cent increase in measured resources, largely the result of continued uranium exploration and development in northern Saskatchewan. Canada's five uranium producers, operating seven production centres, supported a workforce of 5,200 and produced concentrates in 1985 containing 10,880 tonnes. About 85 per cent of this country's annual production is destined for export. Canadian producers shipped an estimated 10,029 tonnes in 1985. [Text] [Ottawa THE CITIZEN in English 4 Sep 86 p C13] /9274

CSO: 5120/49

REPORT ON SAFETY CONDITIONS AT NUCLEAR PLANT

Safety Conditions Termed 'Precarious'

PY061650 Sao Paulo FOLHA DE SAO PAULO in Portuguese 4 Sep 86 p 10

[By Flavio Tavares from Buenos Aires]

[Text] A secret report prepared by a control team of the National Atomic Energy Commission [CNEA], which came to light yesterday in Buenos Aires, reveals that current safety conditions are precarious at Atucha I, Argentina's oldest nuclear plant.

Located 100 kilometers to the northeast of Buenos Aires and built using the German technology of the Kraft Werk Union Company (technology similar to that of the Angra I nuclear plant), Atucha I has been operating since 1974k but recently has slipped dangerously into disrepair. In less than 2 years the nuclear plant has experienced three serious accidents that have been kept quiet by the Argentine Government: The first accident occurred on 12 November 1984 when the failure of the cooling pumps' electronic temperature sensor caused the plant to shut down; the second, on 4 July 1985 was caused by a malfunction in a valve; and the third, on 17 September 1985, when pressure in "the primary system" dropped dangerously because the malfunction of an electronic control caused a valve to open.

The report, prepared by the Advisory Council for Nuclear Central Licensing and signed by physicist Adolfo Touzet, briefly refers to those "operational incidents" and, throughout its 15 pages, it carefully details scores of other failures in the security system.

The report reads: "The most serious problem stems from the difficulty in obtaining replacement parts, thus impeding preventive maintenance. This situation, compounded by the suspension of programmed shutdowns for inspection, maintenance, and of worn out elements, has caused a progressive deterioration of the installation."

The report also criticizes the shortage of specialized personnel, pointing out that "in recent years, many of the most qualified and experienced personnel have gone to other duties and no adequate replacements have been provided."

Courses to train nuclear plant personnel "were discontinued 5 years ago and an effort to resume them was suspended." In addition, the report enumerates other fundamental flaws:

1) The engineering group has personnel exclusively for routine work, and it cannot find solutions to the existing situation.

2) The two quality control technicians have been transferred to other duties without being replaced.

3) The currently small technical staff cannot cope with emergency situations in case of operational incidents.

4) Under these conditions it is difficult to review and update operations or even to analyze the results of the "test plan" or to check on the performance of the components "in order to establish the reliability of operations."

5) The electronic modules and components of the plant's control system belong to an obsolete generation that has been superseded, thus "calling for special maintenance."

The report says that serious trouble was detected in June 1985 when fuel elements were found to have been damaged. A high reading on the monitors sounded an alert, and one of the "damaged fuel elements" was identified "only by the difficult job of sliding it back into its respective channel."

After enumerating the failures at a plant in Belgium in 1983, the report says that a similar accident occurred in Atucha I, "where there have been problems in assembling the seals on the main pumps." This seems to refer to the cooling system of the Argentine plant.

The CNEA yesterday confirmed the authenticity of the report, which was published by the newspaper AMBITO FINANCIERO. Before noting that "the level of safety requirements at the plant is one of the highest in the world," an official CNEA communique stressed that "the report is valuable only as a basis for studies by the "Advisory Council," which will issue the final conclusions."

The Advisory Council for Nuclear Central Licensing has been inactive at least since last March. Since then it has not said a word about the safety problems and risks in Argentina's oldest nuclear plant, which has a generating capacity of 320 mw and supplies electricity to part of Buenos Aires.

The report stresses that the plant's current operation "does not comply with established norms."

CNEA President Alberto Constantini said, however, that there is no reason for alarm: "The safety conditions continue to be good and the plant is operating normally."

CNEA Chief Denies Safety Risk

PY061224 Buenos Aires BUENOS AIRES HERALD in English 5 Sep 86 p 11

[Text] (NA)--The head of the National Atomic Energy Commission (CNEA) Alberto Constantini yesterday denied there was any danger regarding security conditions in the Atucha I nuclear power plant, adding that work under way there would not be paralyzed.

He was replying to a report issued by the Advisory Council for the Licensing of Nuclear Installations (CALIN), one of the departments of his commission, which said security conditions at the Atucha I plant were not up to normal requirements.

Constantini said the report was issued by mistake and insisted that "we can give assurances that the Atucha I plant is operating under total security and we are determined to fully meet all security norms even though, as has been characteristic in Argentina, they be excessive as regards reality."

He added that it was necessary to clarify this because of the psychosis sparked by the accident at the Chernobyl plant in the Soviet Union.

"We have spent in Argentina $2,000 per kilowatt against $200 spent by Russia, because we want to have greater security and--that security--we're going to preserve it," he said.

New Plant Possible in Chaco

PY070345 Buenos Aires TIEMPO ARGENTINO in Spanish 3 Sep 86 p 16

[By TIEMPO ARGENTINO correspondent in Resistencia Reynaldo Martinez]

[Excerpt] Alberto Constantini, chairman of the Argentine National Atomic Energy Commission [CNEA] has said it is possible that a nuclear power plant will be built in the Argentine northeast, specifically in Chaco Province, because "the type and cost of the fourth and fifth Argentine nuclear plants are currently under study." He stated that once this stage is over, feasibility and site studies will be conducted.

Constantini went on to say that "Chaco Province is appropriate because nuclear plants require areas free of seismic activity that have an abundance of water available, conditions that are fully met by that province." He added that CNEA's policy is to "gradually decentralize from the Federal Capital not only the nuclear power plants but also other activities and to distribute them among the provinces."

Constantini was participating in the First Congress on Nuclear Energy to be held in Resistencia, and he has signed an agreement with Chaco Governor Florencio Tenev "to promote the use, development and application of radioisotope techniques in the fields of medicine, biology, drug production, agriculture, livestock, renewable and nonrenewable resources, industry and physical and chemical nutrition."

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CSO: 5100/2127

ARGENTINA

BRIEFS

COMMUNIQUE ON NUCLEAR PLANT SAFETY--Buenos Aires, 28 Aug (TELAM)--The National Nuclear Energy Commission (ENEA) tonight gave assurances that Argentine nuclear plants are functioning absolutely normally and in compliance with strict safety conditions. In a communique released by Government House, the CNEA stated that the public does not have to worry about the operation of nuclear plants or about safety conditions. The CNEA also dismissed press reports that have cast doubts over the operation of the plants. The CNEA deplored that the information, aired by radio stations, has raised doubts among the public. The commission said that the information was based on an internal report which was issued by an advisory organ. The report contained neither resolutions nor conclusiions, merely observations of a purely technical nature that must be evaluated by specialists. The CNEA explained that the internal report was produced by the Advisory Council for Licensing Nuclear Facilities (CALIN) and that, as such, its only purpose is to serve as a document for analysis by CALIN members. The communique said that the report will be considered valid only if CALIN issues a recommendation. The CNEA communique was released after CNEA head Alberto Constantini met with President Raul Alfonsin. [Text] [Buenos Aires TELAM in Spanish 0113 GMT 29 Aug 86 PY] /8918

CSO: 5100/2127

INDIAN HELP ON FAST-BREEDER TECHNOLOGY SOUGHT

PY062220 Sao Paulo FOLHA DE SAO PAULO in Portuguese 27 Aug 86 p 4

[Text] Brazil has requested Indian cooperation to develop the technology to build fast-breeder reactors, which are extremely sophisticated and continue working after having consumer their initial fuel. They are internationally known as "fast breeders" [in English].

The initial contacts with India were made last January, when the chief of the Nuclear Energy Division of the Advanced Studies Institute [IEAV[Raghavan Pillai Kesavan Nair, visited the Indira Gandhi Research Center in Kalpakaam, southern India during his vacation.

The IEAV belongs to the Aerospace Technology Center [CTA] of the Aeronautics Ministry, and is located in Sao Jose dos Campos (97 km northwest Sao Paulo).

The Indira Gandhi Research Center is responsible for developing technologies of sodium refrigerated fast breeders. By the end of last year, the Indian scientists had achieved criticality with their experimental fast breeder for the first time. This means that they put in operation a prototype of a reactor which was not meant to produce energy but rather to train experts in its construction and operation.

On that occasion, Kesavan talked with Indira Gandhi Research Center managers about establishing two lines of cooperation between Indian and Brazil's IEAV: one in the field of test breeder construction technology, and the other in the field of nuclear data, that is, computer storage of the data necessary for a fast breeder reactor project.

The Nuclear Engineering Institute [IEN] of the National Commission for Nuclear Energy [CNEN], located on the Rio de Janeiro Federal University [UFRJ] campus on Fundao Island (north of Rio), is also working on construction technology for a fast breeder. One of the research projects that is being carried out is on the so-called "sodium circiut," in other words, the reactor is cooled with sodium. During the first half of the year, a CTA team visited the IEN to become acquainted with these research projects.

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CSO: 5100/2130

BRAZIL

OFFICIAL ADMITS RESEARCH IN NUCLEAR FUEL CYCLE

Submarine Fuel Needs

PY110219 Rio de Janeiro Rede Globo Television in Portuguese 0025 GMT 11 Sep 86

[Interview with Rex Nazare, Chairman of the National Nuclear Energy Commission on the Globo Reporter Program, "Brazilian Materiel Industry"; date and place not given -- recorded]

[Text] [Reporter] In order for Brazil to build nuclear submarines, it must know how to make the fuel: enriched uranium. Brazil must master the nuclear cycle. The only person who can tell us the truth about the research being done in this sector is Rex Nazare, president of the Brazilian Nuclear Energy Commission. Will Brazil some day be in a position to have fuel for a nuclear submarine?

[Nazare] Brazil is carrying out research in these areas in order to fully master the fuel cycle, including the enrichment of uranium. Once we master this cycle, we will be able to supply this material for nuclear propulsion and after a given amount of time, we will be able to provide fuel for nuclear submarines.

[Reporter] Does this mean that Brazil is developing an entirely Brazilian project for mastering nuclear technology?

[Nazare] Yes, based on the characteristics of its minerals, and on the deposits existing in the country, Brazil has decided to develop the complete cycle of nuclear fuel for peaceful purposes.

[Reporter] What is the current level of development of this research?

[Nazare] Look, like any industrial development, this is a matter that requires national secrecy.

Program With Argentina

PY110115 Madrid EFE in Spanish 2339 GMT 10 Sep 86

[Text] Brasilia, 10 Sep (EFE) -- The Brazilian Government announced today for the first time that it has been developing an uranium-enrichment program for nuclear fuel with Argentina.

The announcement will be made by Rex Nazare. President of the National Nuclear Energy Commission, during a program to be broadcast tonight by the GLOBO television network.

The GLOBO network has reported that Nazare will say that "the program is being carried out in cooperation with Argentina."

/9738
CSO: 5100/2126

NUCLEAR SUBMARINE CONSTRUCTION TO TAKE 10 YEARS

PY070040 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 5 Sep 86 p 5

[Excerpts] The project for the construction of a Brazilian nuclear submarine is technically viable: The construction of a centrifuge prototype for the enrichment of uranium to propel a submarine has been completed. This information was passed on to O ESTADO reporter Helio Contreiras by a high-level government source. In his Rio de Janeiro office, Navy Minister Admiral Henrique Saboia declined to elaborate on this information, stating that it is a secret research project. He said: "We have no reason not to proceed with a project that will give us a nuclear submarine in the future." He emphasized that the project is for the construction of a nuclear submarine, not an atomic bomb.

According to the government source, the project is further along than the press has reported. The construction of the first centrifuge prototype has already secured for Brazil the possibility of developing the technology necessary for a nuclear submarine. Of course, Brazil must also gain the capacity to build that type of warship.

The Navy Engineering Directorate has already prepared a plan for a Brazilian nuclear submarine. To build a nuclear submarine, the Navy cannot depend on a foreign plan, as it is doing with three conventional units that will be built in the Navy Arsenal of Rio de Janeiro. These will follow a German plan known as the IKL-209-1400 Class. The Navy is also conducting research with the cooperation of the Nuclear Research Institute (IPEN) and the University of Sao Paulo.

According to an officer who has followed the process from the beginning, one of the problems of the uranium-enrichment project that will produce the nuclear fuel to propel the submarine involved metallurgy, but it has been overcome. The Brazilian nuclear submarine could be operational within 10 years, depending on the financial resources available for the project. This timetable, which might very well be shortened, was based on the Navy's more recent budgets.

NUCLEP [NUCLEBRAS Heavy Equipment, Inc.], a NUCLEBRAS subsidiary, is participating in the construction of the first three conventional submarines in the Rio de Janeiro Navy Arsenal. This experience should facilitate the construction of the nuclear submarine. The Navy minister revealed that an agreement to that effect had already been signed with NUCLEP.

Under the contract signed with the Navy, NUCLEP will build the hulls of the first three conventional submarines and will later participate in the development of the nuclear unit.

/9716
CSO: 5100/2124

BANGLADESH

BRIEFS

NUCLEAR RESEARCH REACTOR COMMISSIONED--A 3-megawatt research reactor was commissioned at the Atomic Energy Research Establishment at Savar near Dhaka today. The chairman of Bangladesh Atomic Energy Commission told newsmen that the 180-million taka reactor will help establish a scientific and technological base in nuclear science and technology in the country. The opening of the reactor was witnessed by the secretary of the Ministry of Energy and senior officials of the Atomic Energy Commission. The chairman said the safety of the reactor was thoroughly examined by a committee of experts. It will not pose any safety problem of health or health hazards to the workers and the public during normal operation. He added that this reactor is covered under the safeguard agreement with the International Atomic Energy Agency. [Text] [Dhaka Domestic Service in English 1530 GMT 14 Sep 86 BK] /9274

CSO: 5100/4756

INDIA

GANDHI EXPLAINS POSITION ON NUCLEAR WEAPONS

New Delhi PATRIOT in English 12 Aug 86 p 1

[Article by Sitansu Das]

[Excerpts] After a sleepless night at Moscow airport, where he was forced to land shortly after midnight, Prime Minister Rajiv Gandhi said the killing of General Arun Vaidya, need not mark deterioration in the situation created by terrorists.

The Prime Minister was answering questions by the journalists aboard the aircraft the Soviet authorities had placed at his disposal for his return to Delhi after a fire alarm in No 3 engine of the four-engine Boeing 707 obliged him to make an emergency landing in Moscow airport.

On India's military nuclear option to counter Pakistan's nuclear weaponry programme, the Prime Minister said: "I have reiterated on a number of occasions that we really have no intention to build a nuclear weapon. We do not think it will be beneficial to us. We do not think we can really afford a nuclear weapon and all that goes with nuclear weapons (delivery systems etc.).

What would India do if Pakistan went ahead and acquired the nuclear weapon? Mr Rajiv Gandhi replied: "We do not have an answer at the moment. We hope that Pakistan's friends would persuade it not to get nuclear weaponry".

Asked if his reply today on India's nuclear option was not somewhat different from the positions taken by him in the past (in that he ruled out today nuclear weapons for India, regardless of the contingencies in the neighbourhood, his past positions seemed to leave India's response somewhat flexible), the Prime Minister was firm in asserting that there was no modification. What he said today had in effect been said by him in all previous statements since he took over as Prime Minister.

Arising from his replies on the nuclear option was a question he answered about India's attitude towards the NPT. As the Prime Minister had ruled out the N-weapon for India, what attitude should India be taking towards nuclear proliferation—over which India's position, since this country had abandoned the possibility of ever acquiring atomic weapons, gave India many disadvantages without offering the prospects of any current or future benefit? The Prime Minister said proliferation was a complex problem which engaged attention. But he, as of now, had no solution to offer.

/13104
CSO: 5150/0168

INDIA

NUCLEAR POWER CHAIRMAN BRIEFS SCIENTISTS ON PLANS

Bombay THE TIMES OF INDIA in English 8 Aug 86 p 9

[Article by George Abraham]

[Text] THE nuclear power board (NPB) is to be converted into an autonomous corporation within the next six months to enable the department of atomic energy (DAE) to tap extra-budgetary resources and meet the goal of 10,000 MW of nuclear power by 2000 AD.

Scientists and officials of the NPB were briefed about this at a meeting convened by Dr. M. R. Srinivasan, chairman of the NPB, a fortnight ago.

The corporation proposal is now before the DAE, of which, the NPB is a constituent unit, Dr. Srinivasan told this paper today.

The NPB is responsible for the design, commissioning and operation of nuclear power plants all over the country. It currently operates the atomic power stations at Tarapur, Rawatbhata and Kalpakkam.

The planning commission has allocated Rs. 1,410 crores to the DAE for the nuclear power sector under the seventh five-year plan. This will just about meet the cost of setting up four additional 235 MW stations, two each at Narora in U.P. and Kakrapar in Gujarat, all of which will be commissioned by 1990, a senior official of the DAE said.

The DAE has gone ahead with its plans to commence work on four more stations, two each at Kaiga in Karnataka and Rawatbhata in Rajasthan — all of 235 MW installed capacity. These will be commissioned in 1994, sources said.

Additional powers were given to the NPB in 1984-85, when the Power Projects Engineering Division (PPED) was reconstituted to form the board. Groups were formed within the NPB for the design, engineering and implementation of the 235 MW and the proposed 500 MW units.

N-POWER PROFILE

The nuclear power profile for 1985-2000 AD will entail the construction of 12 standardised 235 MW units, and possibly 10 units of 500 MW output each. The programme represents an investment of Rs. 13,940 crores, at 1983 prices.

This goal has been hamstrung by inadequate financial allocations in the Union budget. The formation of a corporation is expected to help because it will be possible to float debentures. However, by giving the NPB the status of a corporation, government control over all nuclear installations will not be diluted, a senior official said.

"They would remain a DAE activity and accountability to Parliament would still be total," he said.

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CSO: 5150/0165

INDIA

DAMAGES TO RAJASTHAN N-POWER UNIT ONE TOLD

Madras THE HINDU in English 13 Aug 86 p 1

[Text] Unit-I of the Rajasthan Atomic Power Station may have to be closed for good.

Nuclear engineers are now conceding that they have failed to repair the cracked end-shield of the reactor detected in 1982, and their fear is that commercial power generation may not be feasible again. At best, they say, the reactor can be got going for conducting experiments, and that too only after spending Rs. 60 crores on its rehabilitation.

PTI reports from Delhi:

Dr. M. R. Srinivasan, Chairman, Nuclear Power Board, told PTI that everything possible had been tried "but we have found it is not possible to solve the problem with existing technology."

The end-shield made of nickel-carbon steel supplied by Canada had been embrittled by radiation. The end-shields are huge plates bolted on to the sides of the cylindrical reactor vessel and the fuel channels, that make up the reactor core, terminate on the end-shields.

Water leak: RAPP—I was shut down on March 4, 1982 after engineers found water leaking from the south end-shield that had cracked. It took three years and Rs. 30 lakhs to plug the leak with a chemical using remote controlled equipment.

The reactor was restarted on February 1, 1985, but had to be shut down after three months as cracks reappeared in a different place, Dr. Srinivasan said.

As conventional methods of sealing did not seem to work, "a decision must be now taken whether or not to remove the damaged end-shield and replace it with a new one," he said.

A new end-shield will give a fresh lease of life to RAPP—I, but it is said to be a major operation involving formidable problems. Nowhere in the world had such replacement been done.

Being highly radioactive, no human being can get anywhere near the reactor vessel and the entire operation including dewelding and unscrewing the bolts must be done by robots that the nuclear industry is yet to develop for such specialised job.

According to experts, the operation would take anywhere up to five years and cost several lakhs of rupees. The only alternative to end-shield replacement is to write off the reactor because it cannot be run with a leaking lid.

Channels plugged: Even after repair, RAPP—I will never again produce its maximum 230 MW power, because seven of its fuel channels have been permanently plugged during attempts in the last four years to prevent spreading of the cracks.

RAPP—I, the first Candu type reactor in India, was built by Canadians and commissioned in 1973. It cost Rs. 178 crores to build and Rs. 46 crores annually to operate.

In its eight-year life time till 1981, the plant suffered 255 outages and lost 571 working days while producing a total of 5882 million units of electricity valued at Rs. 196 crores.

According to Dr. Srinivasan, the problem faced by RAPP—I is not likely to repeat in other Candu reactors in India as the end-shield material is not the same.

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CSO: 5150/0169

INDIA

REPORTS ON ACCIDENT AT TALCHER HEAVY WATER PLANT STUDIED

Bombay THE TIMES OF INDIA in English 18 Aug 86 pp 1, 16

[Article by Praful Bidwai]

[Text] FACED with a persistent demand from the Prime Minister's secretariat for a detailed explanation of the causes of the April 29 accident at the Talcher heavy water plant, the department of atomic energy (DAE) has embarked on a desperate effort to cover up serious lapses in the operation and maintenance of the nuclear facility in Orissa.

The accident, involving an explosion and a major fire that severely damaged vital equipment, has given a further set back to the DAE's heavy water programme, which has already proved the Achilles' heel of its ambitious plan to generate 10,000 megawatts (MW) of atomic electricity by the end of the century.

It was also the latest in a series of mishaps and disasters that have dogged the Talcher plant ever since 1972 and turned it into the country's worst industrial project failure.

The April accident makes it highly unlikely that the plant, already delayed by 11 years and burdened with a faulty process, will ever reach its design capacity of 62.7 tonnes of heavy water a year. Last year it produced less than one tonne and in 1984-85, during commissioning, a miserable 0.32 kg of heavy water—a record capacity rate of 0.51 per cent.

The immediate cause of the accident, it has been established, was the escape of highly flammable (ammonia) synthesis gas from the gasket of a high pressure pump (called mole compressor) in the final stages of the bithermal exchange process which enriches the content of deuterium—the heavy hydrogen isotope that mixes with oxygen to form heavy water.

The synthesis gas is drawn from the neighbouring FCI coal-based fertiliser plant stripped of deuterium and returned for conversion into ammonia. It enters the heavy water unit at a high pressure, between 150 and 230 atmospheres, and is further compressed by the mole pumps to about 300 atmospheres, the design pressure for the exchange process.

During the night of April 29, the compressor gasket failed, leading to a massive explosion and a fire that ranged for 90 minutes and whose intensity was such that metal components lying 10 meters away melted.

The causes of the failure of the bionical gasket were investigated by two bodies, both appointed by the DAE—a high-level inquiry committee, including amongh others Mr. G. Sundaram of the Reactor Research Centre, Kalpakkam, and BARC and DAE heavy water projects officials; and a one-man committee comprising Mr. K. P. Rao, a senior HWP headquarters official appointed by Mr. N. Srinivasan, HWP chief executive and now a member of the Atomic Energy Commission through an official order (HWP/CE/18/86/3107 of June 11).

Mr. Srinivasan is now engaged on an effort to reconcile the findings of the two reports but the conflict between the contents of the two remains unresolved.

The high-level inquiry committee produced a remarkably vague and general report on the basis of which no responsibility could be fixed upon anyone. However, on Page 19 it identified the most likely cause of the accident: the absence in the gasket assembly of one of two thin aluminium liners which are meant to provide a seal and prevent leaks of explosive gases.

The implication of the report is that, either through negligence or deliberately, one of the liners was not put into position in the gasket before its cover was tightened and the compressor was put into use on April 23. This was done six days before the accident. It followed another failure of the equipment leading to a leak. Without the liner, the committee's report argues, the assembly could not be properly sealed, the leak and explosion ensued.

This report did not satisfy the Prime Minister's office which asked for complete details so that responsibility could be fixed on specific individuals. Following this two meetings were held over the past two months by Mr. Gandhi with senior HWP officials including Mr. Srinivasan, Mr. B. N. S. Rao and Mr. K. S. Bimbhatt (executive director); the officials failed to answer the queries made.

Meanwhile Mr. Srinivasan, accepting the main findings of the high-level inquiry committee, asked Mr. K. P. Rao to investigate who or what was responsible for the failure to insert the aluminium liner and for maintenance lapses.

But Mr. Rao has found in his 25-page report that the aluminium liner was not missing at all; that it had been inserted and was in place, and that the probable causes of the gasket failure lay elsewhere — in faulty operating and maintenance practices.

POTENTIAL FACTORS

He has identified five such potential factors. Among them is the possible carry-over the process catalyst, potassium amide, into the compressor and consequent damage to the liner. Or electrical mishap could have occured in the compressor motor. An important possible cause might be this initial under-tightening of the gasket cover bolts, or their subsequent loosening due to vibrations, or changes in pressure and temperature, which could have pushed the liner loose and ejected it from the gasket.

According to some Talcher engineers, the most plausible explanation might be that the concerned employees did not tighten the bolts nearly enough since they did not have a simple tool, the torque wrench, to enable them to decide just how hard they ought to turn the bolts. At any rate, each factor implies a lapse on the part of the Talcher's management.

But the manufacturers of the equipment themselves never specified the requisite tongue and other parameters. Nor did the DAE insist on the specifications before granting the plant's West German erectors, Udhe GMBH, an acceptance certificate in July 1983. This was done without even going through a full trial run to prove the viability of the plant.

This lapse on the DAE's part has been one source of the major flaws in the Talcher plant. Besides numerous problems such as the failure of critical equipment like plunger pumps (documented in detail in these pages on May 4 and 5 1984) and poor enrichment the plant remains dogged by a basic process flaw the potassium amide catalyst gets deposited everywhere and chokes the pipes and reaction trays. Thus instead of producing as designed, 7.8 kg of heavy water per hour, the plant can run for a short while at one to two kg per hour before it slows down to the poor rate of 0.1 kg. or 0.2 kg per hour — and finally comes to a complete halt due to choking and other mutually compounding failures. Its recovery rate has also already degenerated to only one-half of the design specifications.

It is not as if these problems were never acknowledged by the personnel working at Talcher. Indeed, its former works manager, Mr. Y. K. Bansal, had repeatedly written in numerous monthly reports in 1983 and 1984 that "the plant cannot be commissioned without major modifications." But he was consistently ignored and more recently, from Talchar to Bombay transferred. Of the five senior engineers who were were connected with the erection of the plant and had acquired some familiarity with its problems, four have been pulled out of Talcher. Meanwhile, all its major problems persist unrectified.

The plant was to have been fully operational and producing 5,225 kg a month by September 1975. Instead 11 years or 131 months later, it has so far cumulatively produced less than a quarter of that quantity.

Its cost, originally estimated at Rs. 21.2 crores, has already leapt to Rs. 65 crores. It will consume another Rs. 2 crores during the seventh plan. In the current year, alone it will in addition get a non-plant support of Rs. 5.7 crores.

These recurrent and ever-increasing expenditure have produced no improvement in the DAE's ability to learn from its past mistakes. Last September a serious fire occurred at Talcher. In November last year, there was another gasket failure. But it remained uninvestigated and hence no corrective steps, such as might have helped prevent or contain a mishap of the April

29 variety, were taken.

Meanwhile, HWP engineers wonder whether the failure of the gasket and of the metal liner seal will necessitate a re-examination and redesigning of similar devices used in other heavy water projects as well.

At any rate, the recent accident has not only further delayed the full commissioning of the Talcher plant. It will also cost the government a substantial sum of money — originally stated at Rs. 15 lakhs, modified by the minister of state Mr. Shivraj Patil in his August 6 Lok Sabha statement to Rs. 40 lakhs, and estimated by the Talcher engineers, at close to Rs. 1 crore.

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CSO: 5150/0170

INDIA

MEETINGS DISCUSS, SCORE NUCLEAR POWER USE

Hiroshima Day Meeting

Bombay THE TIMES OF INDIA in English 8 Aug 86 p 17

[Text] NEW DELHI, August 7: Mr. V. R. Krishna Iyer, former supreme court judge, yesterday called for an "autopsy" of our nuclear power policy.

He demanded that independent scientists go into this matter and that there should be no secrecy about the issue.

While speakers at a panel discussion on "nuclear proliferation and arms race", organised by the Committee for a sane nuclear policy (COSNUP) on the occasion of Hiroshima day, discussed the issue on the supposition that nuclear energy was here to stay, Mr. Krishna Iyer lashed out at the "rather unsuspected" aspect — "the menace of the peaceful atom".

Initiating the discussion, he said many had been appealing for the peaceful use of the atom, but today the atom was not peaceful at all. There had been leaks and faults in nuclear reactors in many countries.

Hence, the time had come to look at this problem more closely. Nuclear power could not be left to the scientists as the Three Mile Island accident in the U.S. and the recent Chernobyl accident in the USSR had shown.

The special guest on the occasion, Dr. Humayun Khan, ambassador of Pakistan, asserted that nuclear technology was here to stay and that the question was really a political one of what we intended to do with these technologies, and how India and Pakistan could reassure each other on how they would not produce nuclear weapons.

He said unfortunately unilateral declarations by Pakistan on this issue had not had the desired effect and his country was prepared to participate in any type of conference that would serve the desired purpose.

Speeches at Seminar

Bombay THE TIMES OF INDIA in English 10 Aug 86 p 12

[Text] MR. Justice V. R. Krishna Iyer, retired judge of the supreme court, today said that the Atomic Energy Act of 1948 was "unconstitutional."

Addressing a three-day seminar on "Nuclear energy and the people in India," organised by the Sampoorna Kranti Vidyalaya, Vedchhi, Surat, Mr. Justice Iyer said the Act denied citizens the fundamental right of freedom to information. "Secrecy and democracy are ancient enemies," he remarked.

Mr. Justice Iyer was of the opinion that, using the amount of electricity consumed as a yardstick of national development was a negation of all that Indian civilisation stood for. "The approach to development and progress must be based on the Gandhian cornerstone of the nation," he stressed.

The concept of nuclear energy being a "symbol of the 21st century" was a distorted "value anchorage," the retired judge felt.

The activities of the department of atomic energy (DAE) ought to be an "open book", which should be cross-examined by an independent set of experts. He called for the scrapping of India's nuclear energy programme, and instead allocating more funds for the development of large, small and micro-level hydel projects.

Earlier, Prof. A. K. De, chairman of the atomic energy regulatory board (AERB), said that it was essential for the country to "preserve the nuclear option." Nuclear energy was still the cheapest and less harmful source of electricity, he stressed. Safety was paramount at all nuclear installations and these would never be compromised.

Replying to a question from one of the penelists, Prof. De said that though the-AERB was over two years old, it did not yet have an independent apparatus to evaluate the country's nuclear installations. Thus, the AERB had to depend on DAE personnel for evaluation reports, he said.

Today's proceedings at the seminar was marked by a walk-out by a section of the scientists from the DAE, who took objection to the presence of Mr. Praful Bidwai, journalist and critic of the nuclear establishment. The four scientists who walked out said the organisers had not told them that Mr. Bidwai was a participant at the seminar.

They termed the meeting "political" and one of them remarked: "We will not tell him (Mr. Bidwai) anything."

Mr. Bidwai, who was the main speaker at the afternoon session, analysed "Nuclear energy: culture and society." He said that nuclear energy was born out of the war machine, and was inextricably linked with weapon proliferation. Thus, it was "necessarily open to misuse," he averred.

The enormous expenditure on nuclear energy was unwarranted, as it would never be able to exceed four or five per cent of the nation's power output, he felt.

Mr. Narayan Desai of the Vidyalaya said the emphasis on nuclear energy had deprived other non-conventional energy sources of funds for research and development.

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CSO: 5150/0166

INDIA

BARC TO DECOMMISSION 30-YEAR-OLD RESEARCH REACTOR

Bombay THE TIMES OF INDIA in English 9 Aug 86 p 5

[Text]

BOMBAY, August 8: "The cradle of India's nuclear effort" — the one MW (thermal) research reactor, Apsara, at the BARC here, — will be decommissioned shortly, 30 years after it first attained criticality on August 4, 1956.

The decommissioning process will be routine for the BARC scientists, who earlier decommissioned the zero-power Zerlina research reactor in March-April, 1983.

The Atomic Energy Commission (AEC) gave the go-ahead for the construction of Apsara, the first reactor in Asia excluding the Soviet Union, on March 15, 1955. For the most part of its life, Apsara was run at a power level of 400 KW and was primarily used for basic research in physics and chemistry, and for production of radioisotopes.

Apsara used highly-enriched uranium, which the U.K. provided as fuel, and light water as the neutron moderator and coolant. It belonged to the "swimming pool-type" of reactors and served as one of the prime exhibits for visitors to the BARC who could view the fuel elements and the core, unlike in other contemporary reactors.

The decommissioning will involve the dismantling of Apsara's systems. Radioactive assemblies like the core elements will be stored in shielded enclosures and the non-radioactive sub-assemblies could well be re-employed, senior sources at the BARC said.

The reactor building need not be demolished, but this would depend on the radiation-level there immediately after decommissioning, he said. The Zerlina reactor building is still intact and is used to conduct engineering experiments.

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CSO: 5150/0167

INDIA

BRIEFS

INDO-RUSSIAN PLEA--Bombay, 8 Aug--The sister cities of India and the USSR today appealed to all the cities of the world to actively support the programme of "complete and general elimination of nuclear weapons by the year 2000". The first conference of the sister cities of the two nations which concluded here today, called upon cities everywhere to "demand immediate and complete stopping of nuclear tests". Representatives of Leningrad, Minsk, Volograd, Odessa, Bombay, Delhi, Madras and Calcutta attended the conference. [Text] [Bombay THE TIMES OF INDIA in English 9 Aug 86 p 3] /9274

TRIBALS PROTEST N-PLANT--Surat, 7 Aug--Police fired four rounds in the air and lobbed teargas shells to drive away crowds of tribals at Bedkavudar village, about three km from the Kakrapar nuclear plant today, as the disturbances in the aftermath of the anti-nuclear demonstration there yesterday continued. The advasis were worked up over the police lathi-charge on tribals and others demonstrating against the setting up of the Rs 38-crore nuclear plant at Kakrapar, "Hiroshima Day" yesterday. They continued throwing stones at police parties guarding the area this morning. The police fired in the air on the road linking Vyara town with the plant area, when tribals gheraoed the police and allegedly attacked them. Groups also lay hiding in the bushes and used slings to propel stones at the police, it was stated. Yesterday's demonstration at the atomic plant was organised by the "Gurjarat Anu Urja Jagriti Samiti" and the "Sampoorna Kranti Vidyalaya". Some militant Adviasis tried to loot the residential colonies of the plant staff, but police reportedly foiled the attempt. [Text] [Madras THE HINDU in English 8 Aug 86 p 9] /9274

KAIGA N-POWER UNIT--New Delhi, 13 Aug--The two units of the Kaiga Atomic Power Plant in Karnataka, estimated to cost approximately Rs.600 crores at 1984 prices, are expected to be commissioned in 1994, the Lok Sabha was informed today. About Rs. 19 crores has been spent on site investigations and advance procurement of long delivery equipment. Adequate funds will be provided to complete the project as scheduled. Telugu Ganga project: Andhra Pradesh has proposed forest clearance for the Telugu Ganga project. But it lacked essential information and the State has been requested to furnish them. A final decision on the proposal will be possible only after receipt of this information. [Text] [Madras THE HINDU in English 14 Aug 86 p 6] /9274

BENGAL N-POWER PLEA--New Delhi, 23 Aug--A strong case for setting up a nuclear power plant in West Bengal was made in the Lok Sabha yesterday by Mr Ashutosh

Law, a Congress (I) member from the State. In a special mention, Mr Law said if the power problem of West Bengal was to be solved on a permanent basis, nuclear power would have to be developed in the State in a big way. He said generation of the required amount of power had remained a persistent problem in West Bengal over the decades. During the Seventh Plan period, the additional capacity of 932.5 MW, including a spillover of 58 MW from the Sixth Plan was expected to be installed. In spite of this, there would be a gap between the demand and supply of around 1,030 MW, according to an estimate prepared by the perspective Power Planning Committee. According to the committee, the demand for power in the State for the years 1995 and 2000 would be around 3,411 MW and 4,409 MW, respectively. Availability of power from the existing capacity is estimated to reach 2,309 MW in 1995, which would leave a shortfall of 1,102 MW in supply. One way of achieving increased capacity might be greater utilization of the existing thermal plans and to set up new thermal power projects. Opening of thermal power plants would need adequate supply of coal, whereas coal production in West Bengal has remained almost stagnant. The time factor should also be taken into account. [Text] [Madras THE HINDU in English 24 Aug 86 p 9] /9274

CSO: 5150/0171

ZIMBABWE

NAM SUMMIT POLICY STATEMENT ON PEACEFUL USES OF NUCLEAR ENERGY

LD071333 Belgrade TANJUG in English 0234 GMT 7 Sep 86

["Final Declaration: Peaceful Uses of Nuclear Energy"--TANJUG headline]

[Text] Harare, 6 September (TANJUG)--The Non-Aligned Movement stressed the exceptional importance of international cooperation among the non-aligned countries and other developing countries in the field of peaceful uses of nuclear energy. At their eighth summit in Harare the non-aligned affirmed the inalienable right of all states to apply and develop their programmes for peaceful uses of nuclear energy for economic and social development in conformity with their priorities, interests and needs.

In their final document the heads of state or government expressed concern with regard to the obstacles which the developed countries place in the way of transfer of technologies related to the peaceful uses of atomic energy by fixing conditions which are incompatible with the sovereignty of developing countries.

The non-aligned called for the observance of the principles of non-discrimination and free access to nuclear technology and reaffirmed the right of each country to develop programmes for use of nuclear energy for peaceful purposes in conformity with its own freely determined priorities and needs.

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CSO: 5100/47

ZIMBABWE

NAM SUMMIT POLICY STATEMENT ON ISRAELI ATTACK ON IRAQI REACTOR

LD071415 Belgrade TANJUG in English 0259 GMT 7 Sep 86

["Final Declaration: Israeli Aggression on Iraqi Nuclear Installations"--TANJUG headline]

[Text] Harare, 6, September (TANJUG) — The heads of state or government of non-aligned countries — at their eighth summit meeting in Harare — condemned Israel for its armed aggression against Iraqi nuclear installations, which are subject to the safeguards of the International Atomic Energy Agency (IAEA), as a violation of the IAEA system of safeguards and the inalienable right of peoples to use atomic energy for peaceful purposes.

The non-aligned countries request the Security Council to take effective measures to ensure Israel refrains from strikes or threats to nuclear installations in Iraq or elsewhere including installations subject to the safeguards of IAEA. The non-aligned, therefore, requested IAEA to seek additional measures to effectively ensure that Israel undertakes not to strike or threaten peaceful nuclear installations in Iraq or elsewhere in contravention of the UN Charter and in violation of the IAEA safeguard system.

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CSO: 5100/47

FRANCE

SEISMIC RISK IMPACT ON NUCLEAR POWER PLANT CONSTRUCTION

Paris LIBERATION in French 31 Jul 86 p 15

[Article by Guy Benhamou and Vincent Tardieu: "Earthquakes: France Makes Inventory of Locations"]

[Text] A new map of seismic zones in France has just been published under the aegis of the Major Risks Commission. Even though risks of this type spare the major part of the country, they are however taken into account in the construction of nuclear power plants and dams.

It was 11 June 1909, between Aix and Salon-de-Provence. At 9:15 pm, an earthquake registering an intensity of 9 on the MSK scale, destroyed the surrounding villages in a few seconds: 40 people were dead and many were injured. (Footnote) (The "MSK intensity" scale consists of 12 degrees. It is based on the significance of the damage caused by the earthquake. An intensity of 8 corresponds to the destruction of some dwellings, an intensity of 9 to generalized damage to structures. The Richter scale, on the other hand, is of an instrumental nature and provides the calculated magnitude of an earthquake based on seismographic recordings.) "In Saint-Cannat, the church no longer exists, but is there anything left in what used to be the village?," wrote a reporter at the time. "In Rognes, the mess is even greater. There is nothing left but ruins. In Lambesc, the same spectacle: horrible."

1986. Let us imagine that an identical earthquake were to hit the region -- 22 municipalities, 100,000 inhabitants over an area of 700 square kilometers. Based on a simulation study, the toll would then be 1,000 dead, 5,000 injured and 5 bilion francs (1982) in damages. A cost which represents 0.7 percent of the national budget or 600 percent of the budget of the Provence-Cote d'Azur region. A really "minor" earthquake in an area that is not highly urbanized. Hence, one can imagine the value of the new map of seismic zones in France, which has just been published under the aegis of the Major Risks Commission.

With nearly 400 pages and more than 50 maps, the publication of the new seismic zones reestablishes a hierarchy among the various regions. Overall, 35 departments are included among the average and low seismicity zones. On the front line, the Pyrenees, the Alpine massif, the Cote d'Azur, Limagne and Alsace-Lorraine. All these regions, which are relief zones or rift valleys, are covered with faults. Every time cracks appear in the earth's crust, you get a tremor.

This new seismic zoning was carried out by the Bureau of Geological and Mining Exploration [BRGM], with the help of the Atomic Energy Commision [AEC] and the EDF [French Electric Company], due to the presence of numerous nuclear power plants in the sensitive zones. They had to compile an inventory of the 5,000 earthquakes which have occurred primarily over the last five centuries, assemble them in a data file, then run them on a program allowing subsequent examination of various criteria such as locations, dates, intensities... Hence, the resulting map provides "a statistical image of the seismicity of the territory," on which it can fortunately be noted that the large majority of the country is spared this kind of risk. But surprises are always possible...

Earthquake Preparation

In the introduction, Renaud Vic de Sage, delegate to the Major Risks Commission, stressed that "people confuse anti-seismic preparation and anti-seismic construction. But, while the dead and the wounded are victims of the collapse of structures, the fact that they did not collapse is not a sufficient criterion of security. Hospitals, rescue centers and telecommunication centers must remain operational after an earthquake. The same is true for industrial installations and stockpiles of dangerous materials." One might as well also avoid a technological catastrophe. Hence, the problem of preventing the risk of earthquakes extends largely beyond the framework of the construction industry and must take into account all the infrastructures of a region, the telephone system, the road network, water mains and gas lines, electric transmission, etcetera...

Let us look specifically at the effects on the mastodons of modern urbanization, nuclear power plants and dams. There is reason to worry about their concentration when you superimpose the new seismic risk map within the Hexagon on that of the location of nuclear and hydraulic sites. About 10 power plants and about 60 dams are located precisely in these zones, mostly along the Rhone and the Rhine or their tributaries. But, however troubling it may be, this superimposition does not imply a particular increase in risk for the population. That, at least, is the firm assurance given by the EDF experts.

Each time the French Electric Company wishes to build a power plant or a dam it proceeds with a historical study of the seismic risks of the area being considered: that is the determination of the famous Maximum Likely Historic Earthquakes [SMHV], which makes it possible to figure a seismicity threshold on the MSK scale compatible with the construction of the installations. For the power plants, three sets of figures must be considered, according to the EDF text: "Safety and Choice of Nuclear Sites"; (1) "With a seismic intensity on the order of 8 MKS, it is possible to build standard installations on that site"; (2) "With an intensity of 8 to 9 MKS, it is necessary to make special structural arrangements"; (3) "Beyond 9, the construction project is abandoned."

According to Pierre Pollier (head of the "Sites" division in the Equipment Department at EDF), the "structural arrangements" in question, made for example at Cruas (Ardeche), consist of "inserting 200 to 300 plugs (concrete cubes) in the soil at 1 meter intervals to form a kind of pavement. Then layers of steel and neoprene are poured over it, as well as a bed plate (large substructure slab). Our system has been accepted by the relevant authorities at the Ministry of Industry (SCSIN) and at AEC (IPSN)."

Construction of Dams

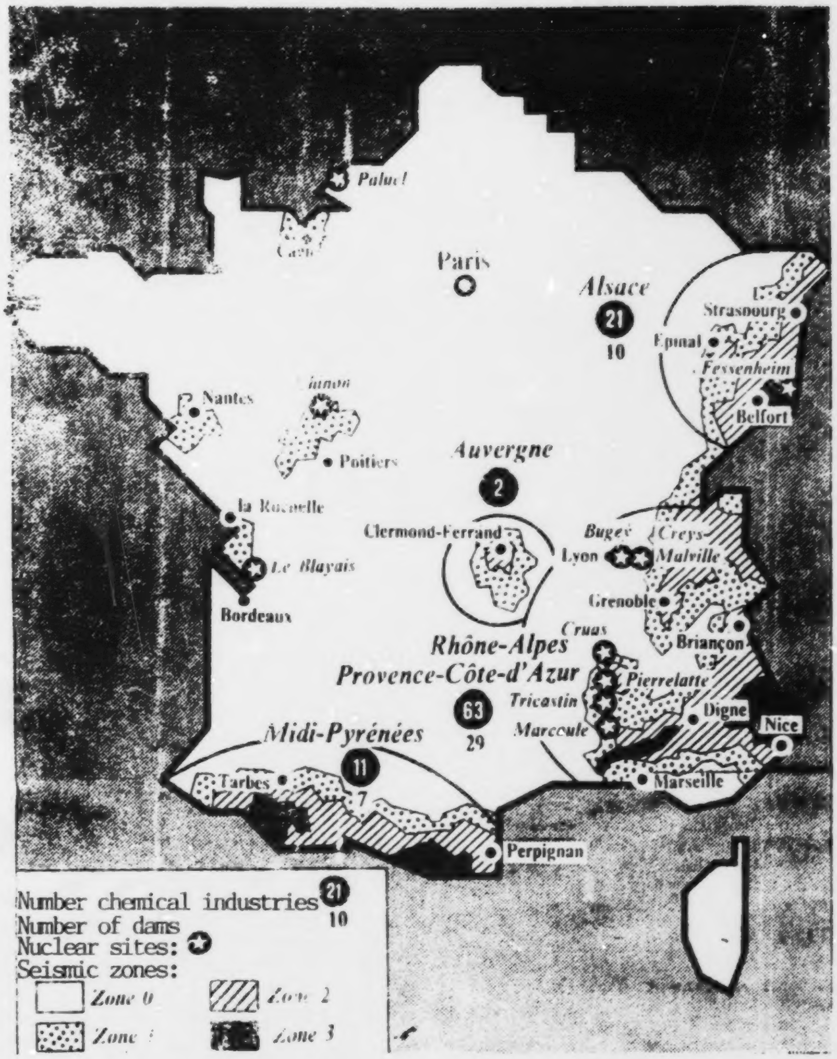
As for dams, there is maximum confidence: "There should be no fear at all with those enormous structures," stated an EDF expert on hydraulic installations. "The very shape of the dams, their mass, constitute an anti-seismic structure in and of themselves. Even with an intensity of 10 MSK, those installations do not risk much. Not a single dam project has been abandoned for reasons of seismicity and, throughout the world, none has caused deaths for the same reasons. At the time of the last earthquake in Mexico, the large Infiernello dam near the epicenter was not destroyed, only 50 meters of its railing collapsed. And yet, this was the second time it was shaken by an earthquake. In any case, all our studies and constructions are inspected by the interministerial Permanent Technical Committee for Dams [CTPB]."

The most serious problem, in fact, would come from the establishment of chemical industries in those zones. More specifically, establishments "subject to Article 5 of the Seveso directive" (European), producers of extremely corrosive products (chlorine and other gasses or flammable liquids...). About 100 of them are located in the seismic zones: 20 in Alsace and one on the territory of Belfort, 18 in the Rhone-Alpes region, 2 in Auvergne, 11 in the Pyrenees region, and 45 in the Provence-Alpes-Cote d'Azur region.

"It will probably be necessary," stressed Patrick Guilhaudin, adviser for major risks to the minister of environmental affairs, "to check the conformity of the installations with this type of risk. Which could eventually lead to an effort to contain several installations at risk." Even then it will be necessary to make sure that this type of containment will prove effective to resist the most intense earthquakes, and to know who will pay for these new installations . Would it not be better, in some cases, to move a few enterprises, or at least to limit their establishment? A more radical approach adopted by Haroun Tazieff, representative in Isere of Vice Minister for Environmental Affairs Alain Carignon: "What would be involved would be to enact real requirements, and to have them implemented. Without that the reports will not serve much purpose."

The real stakes of this new study relate to possible changes in the permits and standards of construction. For the time being, the ministry remains completely silent on the subject, but assures that it will initiate interministerial consultations right after the vacation period. Hence, the only action provided for is to circulate this report first of all to the regional decision makers, before producing a number for the public at large. In order to calm the people's worries at the sound of the first rumbling of the earth. "Between tomorrow and the year 2000," as suggested by Haroun Tazieff...

Map: Seismic Zones in France.


Paluel
Caen
Paris
Alsace
21
10
Strasbourg
Epinal
Fessenheim
Belfort
Nantes
Chinon
Poitiers
Auvergne
2
La Rochelle
Le Blayais
Bordeaux
Clermont-Ferrand
Bugey
Creys-Malville
Lyon
Grenoble
Cruas
Briançon
Rhône-Alpes
Provence-Côte-d'Azur
63
29
Tricastin
Marcoule
Pierrelatte
Digne
Nice
Marseille
Midi-Pyrénées
11
7
Tarbes
Perpignan
Number chemical industries 21
Number of dams 10
Nuclear sites:
Seismic zones:
Zone 0
Zone 1
Zone 2
Zone 3

Four Earthquake Zones in France

In Zone 0, no anti-earthquake rule is compulsory: no earthquakes have ever occured there. The seismicity of Zone 1 is very low but not negligeable on the MSK scale: the intensity limit is 8, which corresponds to the destruction of some dwellings. The seismicity of Zone 2 is low and does not go beyond 9, which does however correspond to generalized damage to structures. There the time interval between two earthquakes registering an intensity of 8 is approximately 250 years. In Zone 3, the seismicity is average, reaching an intensity above or equal to 9. There the time interval between two earthquakes registering an intensity of 8 is less than 200 years.

While the majority of the power plants and dams are located in these zones, it has never been possible to observe the effects of earthquakes with an intensity of 7 to 9. The real danger could come from certain chemical enterprises, which are very numerous in these zones and whose toxic products are sometimes poorly contained.

These are establishments subject to the regulations of the "Seveso" directive.

8463
CSO: 5100/2562

SWEDEN

BRIEFS

ZIRCONIUM PIPE EXPORT APPROVED--AB Sandvik Steel has obtained government permission to send 18,000 kilograms of so-called zirconium pipes for nuclear power plants in France and West Germany. Export of zirconium pipes is considered export of sensitive nuclear equipment, and can only be made to countries which have pledged to use the pipes only in civilian nuclear power industry. Therefore each request for exporting must be handled separately. So far Sandvik has exported zirconium pipes to Japan in various quantities, to other European countries and to the United States. However, this export activity is surrounded by much hush-hush, due to the fact that there are only a few companies in the world which make zirconium pipes. These are in very much demand by the nuclear power industry, since on the one hand they are made of special alloy making them immune to rust, and on the other hand because they can be used in all types of light-water reactors. [Text] [Stockholm DAGENS NYHETER in Swedish 6 Sep 86 p 14] /12232

CSO: 5100/2573

END

JPRS-TND-86-022

16 OCTOBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

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JPRS-TND-86-022

16 OCTOBER 1986

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NUCLEAR DEVELOPMENT AND PROLIFERATION

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DAYA BAY FACT-FINDING TEAMS RELEASE REPORT ON MISSION

Points Summarized

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 16

[Article by Albert Chan, Michelle Innis, Frank Choi, Wong Wing-hang, and C.K. Lau; first paragraph is SOUTH CHINA MORNING POST introduction]

[Text] The report by the Legislative Council fact-finding delegations on nuclear power was released on Saturday. Details and comments by Albert Chan, Michelle Innis, Frank Choi, Wong Wing-hang and C.K. Lau.

GENERAL OBSERVATIONS

ACCORDING to the information provided by France, the United States, Japan and the International Atomic Energy Agency experts during the fact-finding trips, the following observations are made:

(1) The pressurised water reactor (PWR), as is proposed for Daya Bay, is designed and will be constructed in such a way that even in the event of the worst accident resulting in a core meltdown, the containment building will be able to contain most of the radioactive products.

(2) The emergency planning required to be done to prepare for the worst accident will be:

(a) Possible evacuation within a radius of 10 km, adopted in France and Japan, or 16 km, as is required in the US.

(b) Contingency action on food and water to be taken within a radius of 50 km (80 km in US) from the nuclear plant.

(3) It is highly unlikely that an accident such as that of the Chernobyl RBMK nuclear power plant would happen to a PWR.

(4) An additional safety feature has been developed and adopted by France and other countries for modification of existing plants to reduce the build-up of pressure to a safe level, where necessary, inside the containment building in case of a severe accident. This is done by means of a controlled sand filter system, the usefulness of which is recognised by the IAEA.

(5) All improvements developed for control-room design as a result of the Three Mile Island accident have been incorporated in the design for the Daya Bay plant.

(6) The question of metal fatigue affecting the material used for the reactor pressure vessel has been resolved.

(7) The cost of nuclear power varies from country to country, and while in other countries the average cost of nuclear-generated power is cheaper than coal-fired generated power, in the US nuclear-generated power is more expensive than coal-fired generated power.

(8) The safety of a nuclear power plant depends to a great extent on safe operation by a well-trained operation crew. In France, the US and Japan, operators are licensed by the regulatory authority of the country. The operation crew undergo frequent periodical retraining to refresh them in emergency procedures to heighten their emergency response capability.

(9) In the US, near-site and off-site emergency response services centres are set up by the nuclear power companies to give technical support to the operation crew in case of emergency. A clear line of communication is set up and there is a clear chain of command to ensure that an emergency is handled properly.

(10) All nuclear power plants visited by the delegations are security-tight. Access and exit of all persons must be authorised and are computer-controlled and recorded. Site boundaries are monitored by closed-circuit cameras and stringent precautions are taken against sabotage.

(11) The relationship between utility companies, government and the public in the countries visited is very open. General information about nuclear energy and the design and operation and nuclear power plants is made easily available. The public

participate in public hearings, visit the plants and get involved in emergency planning.

Observations for the consideration of the Chinese Government and the Guangdong Nuclear Power Joint Venture Company

It has to be stated that it is recognised that the decision to build or not to build a nuclear power plant at Daya Bay lies within the jurisdiction of the Chinese Government, and we fully recognise the deep concern of the Hongkong people over the safety, management and operation aspects of the plant.

If a nuclear power plant is to be built at Daya Bay, the following observations are for the consideration of the Chinese Government and the Guangdong Nuclear Power Joint Venture Company (GNPJVC):

Design and Construction

(1) To incorporate the sand-filter system into the containment building design so as to increase further the safety features of the containment building at the highest level under a condition of high-pressure build-up.

(2) To incorporate a hydrogen recombiner system so as to reduce the probable danger of high-level hydrogen concentration, thereby avoiding the possibility of hydrogen combustion.

(3) To incorporate pressurised containment penetration design on to the penetration sleeves of those pipes that have to penetrate the containment building. The incorporation of this feature would help prevent any leak of air from inside the containment to other areas.

(4) To establish an emergency response facilities centre within site boundary but isolated from the plant, where technical support and command control can be given during an emergency.

(5) To ensure that the nuclear island (reactor building) is so constructed as to avoid contamination of underground water in case of a severe accident.

(6) To ensure, during construction stage, stringent quality control, and to make use of the IAEA Pre-Operational Safety Review Teams (Pre-OSART) visit to Daya Bay.

Accidents and emergency planning:

(1) To set up a national incident response headquarters to give support to the nuclear plants at Daya Bay and elsewhere in the event of incidents, and to consider direct access to the computer data links to be offered by Electricitie de France (EdF).

(2) To establish an effective and independent communications system, including direct telephone lines and back-up facilities, for communication during emergencies between the Daya Bay plant, the Chinese nuclear safety authorities and the Hongkong Government.

(3) To use a single, consolidated instruction manual for plant operation, specifying clearly the chain of command and operational steps in the event of an accident or an emergency warranting a shutdown.

(4) To join the IAEA Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

(5) To draw up comprehensive and well co-ordinated emergency plans for the safety of the people living in the close vicinity (10 km by French standard, 16 km by the US standard, and 8-10 km by Japanese standard) of the Daya Bay plant.

(6) To enter cross-boundary agreements with Hongkong on the exchange of information and co-ordination of contingency planning.

Central Management

(1) To take up a further technical assistance contract with EdF after commissioning and during the life span of the Daya Bay plant.

(2) To delineate clearly the sphere of responsibilities between the government ministries and agencies for management and regulatory control of nuclear plants so as to ensure that there are checks and balances.

(3) To establish an independent advisory body for nuclear safety and nuclear regulatory control with Hongkong participation, and to draw on the knowledge and experience of experts from IAEA, France, US and Japan.

(4) To set up an independent inspectorate to inspect the nuclear plants to ensure that safety standards are maintained and safety regulations are enforced.

Plant management and training

(1) To provide for HKNIC's participation in the management of the Daya Bay plant for the life span of the plant.

(2) To develop a system of regular inspection and maintenance for the Daya Bay nuclear power plant to secure operational quality assurance.

(3) To institute regular training and retraining to heighten the operating crews' awareness of safety and preparedness for responding to emergencies (in the case of US, operators are required to attend a week of simulator room retraining for every four to six weeks of normal work).

(4) To make use of the IAEA Operational Safety Review Teams (OSART) visits to Daya Bay after commissioning.

(5) To work out and maintain tight security at Daya Bay for the protection of the plant and facilities from sabotage.

Environmental safety

(1) To set up a comprehensive and effective system of monitoring stations for monitoring radiation.

(2) To study the possibilities of atmospheric dispersion of radionuclides affecting the food chain and sources of water supply to the surrounding areas including Hongkong and draw up remedial measures if contamination occurs.

(3) To draw on the knowledge and experience for disposal of nuclear waste from such countries as France, US and Japan which have done advanced research into this problem.

International arrangements

(1) To make the most of all IAEA assistance in training, inspection mission, and regulatory advice, and adopting, to start with, the IAEA safety requirements criteria as set out in the Nuclear Safety Standards (NUSS).

Public education and information

(1) To urge the GNPJVC to play an active role, as in the case of utility companies in France, US and Japan, in educating the public about nuclear energy in general and the Daya Bay plant in particular.

(2) To require Framatome to explain to the public the design of the Daya Bay plant, and how the safety features could counter the maximum credible accidents.

(3) To make available as much information as possible to the Hongkong public about the construction, quality, and precautions taken for the plant; and to set up a public inquiry bureau to facilitate better understanding.

(4) To make public the safety analysis reports prepared by EdF when it is completed.

Economic aspects

The economic efficiency of nuclear power is multifactoral, and varies from country to country, and we cannot make an assessment on whether there are economic benefits to China in building the Daya Bay nuclear power plant or not. Nevertheless, we wish to ensure that the future electricity tariff being charged to the people of Hongkong will not be higher than the tariff charged by the Hongkong power companies for the life span of the Daya Bay nuclear power plant.

Observations for the consideration of the Hongkong Government and the Hongkong Nuclear Investment Company

The following observations are for the consideration of the Hongkong Government and the Hongkong Nuclear Investment Company (HKNIC):

Contingency planning

(1) A contingency plan should be drawn up for those areas which lie within 50 km (80 km by US standard) of the Daya Bay plant for protective measures in the event of radiological releases affecting Hongkong.

(2) Protective measures should be planned against the contamination of water supply, vegetables and other food and dairy products.

(3) A government committee should be set up for the preparation of contingency plans.

Cross boundary agreement

(1) Cross boundary agreement should be made with China to enable Hongkong to monitor radioactivity at a close range to the Daya Bay plant, to exchange information and to co-ordinate contingency planning for Hongkong.

Public information

(1) The Hongkong Government should strengthen its public information program to make available information about nuclear energy and the effects of radiation.

(2) The HKNIC and China Light and Power should introduce a public information program and disseminate to the public information with regard to nuclear power. An information bureau should be set up to answer questions from the public.

Advisory committee

(1) The Hongkong Government should set up an independent advisory committee to advise on matters related to nuclear energy.

IAEA membership

(1) To establish international links with nuclear safety agencies, and to obtain information and advice on nuclear safety, the Hongkong Government should consider Hongkong membership with the IAEA.

Atomic Industry Forum membership

(2) HKNIC should consider joining the Atomic Industry Forum, which is a US nationwide as well as an international organisation, to obtain information exchange on, and technical support for, the nuclear industry.

Immediate Effects Envisioned

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 16

[Text]

THERE would be no deaths in Hongkong within 10 hours of an accident at Daya Bay even if winds were blowing towards the territory.

The immediate consequences for Hongkong would be in terms of crops, water and open sea contamination rather than human lives, according to a recently released US study on nuclear research.

Councillors who went on a fact-finding mission to the United States reported that the US Nuclear Regulatory Research group had released the results of a HK$300 million five-year study on the latest research into severe nuclear accidents.

The study, published in July, covered the pressurised water reactors operating in the US which have design features similar to the French model planned for Daya Bay.

An official on the research told the delegation that the effects of a nuclear accident at the Daya Bay site would greatly depend on the specifics of any mishap.

However the official said that if Daya Bay had no containment building or if the containment failed, a two to three-square-foot crack would allow all fission products to escape.

The official said the Daya Bay containment building was required to withstand pressure four to five millibars higher than normal but would probably withstand stresses up to three times higher than the safety requirements.

If a severe accident happened and nothing was done to stabilise the situation, it would take 10 to 30 hours for a sequence of events to take place that would lead to a containment failure.

Because of construction safety margins over and above design requirements, it was possible to have up to 100 hours for corrective action to be taken before the containment structure failed.

When asked if any type of accident would make the containment structure designed for Dava Bay fail, the official said that the chance of such a mishap was "very small."

The official noted there had been two to three incidents in the United States in which the pre-stressed concrete walls of the containment building had allowed slow leakage with no structural damage.

In all likelihood, the official suggested, the containment would be strong enough to withstand the most severe accident.

French Program Praised

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 16

[Text]

THE public should have better access to information about nuclear energy and radiation, say the reports by the Legislative Council teams.

The reports say the Hongkong Government should strengthen its public information program to include information about nuclear energy and the effects of radiation.

It said the Hongkong Nuclear Investment Company and the China Light and Power Company should introduce a public information program, and an information bureau should be set up.

The Legco team to France reported that public meetings were held by the utility company, EdF, which included giving details of the potential risk from nuclear power.

During the construction stage, locals were invited to tour the construction site.

"We feel that the openness of the utility company and the French Government has cultivated a feeling among the locals that the utility company is trustworthy and genuinely contrives to operate and maintain efficient and safe nuclear power plants," the Legco report on France said.

Councillors said in each power plant they visited, there was a public information centre in the vicinity.

Said the report: "We believe the public's confidence in the nuclear power plants in France is not only inspired by their participation in the project and the openness of the utility company, but is also due to the fact that the local officials and representatives and the public have a fair understanding of the action to take in the case of an emergency.

"After commissioning, plant managers continue to inform the local inhabitants, especially the mayor, on any incidents that took place in the plant and EdF newsletters will publish such occurrences."

A copy of the emergency plan is deposited at the town hall for public inspection and pamphlets explaining the precautions to be taken by the public within the emergency zones are distributed.

The Legco report praised the part the French Government took in securing public confidence in the nuclear energy program.

Said the report: "The various regulatory bodies have strived to maintain an independent image. The sharing of responsibility and authority among different ministries also serves to provide the much needed checks and balance. The utility company is obliged to answer to the satisfaction of the authorities every question put to them at the public hearing.

"Although there is no avenue of appeal against the Government's decision on the issuance of authorisation licence, a nuclear plant cannot be built if the majority of the local inhabitants object to it."

The Legco team said there was no formal education program in French schools to specifically educate students on the subject of nuclear energy.

In Austria, where the anti-nuclear movement is stronger than France, the Government was defeated on a 1978 referendum on the construction of its first nuclear plant by 50.1 per cent to 49.9 per cent.

In Japan, the team was told by local officials that the Japanese Government was sensitive to public feelings about nuclear power because of the atomic bombs dropped on the country during World War II.

The Government stresses the safety aspects of nuclear development and appeals for the public's understanding and support.

The subject is not covered by the school curriculum but general education programs and public information about nuclear safety is displayed on television and in newspapers and magazines.

The Government also employs market researchers to conduct surveys on public opinions and feelings. Public opinion is monitored by the Atomic Energy Commission.

The Tokyo Electric Company's nuclear power plant provides information to the public during construction and operation of the plant.

The prefecture government also makes sure that adequate publicity is given. Information released includes the quantity of release from the plant, and radioactivity in soil and water.

The company quickly gave out information about the Chernobyl accident, and a pamphlet explained the difference between the Chernobyl-type reactor and the boiling water reactor.

The team was also told by officials that anti-nuclear movements in Japan were rather scattered. People generally accepted that the trend of the nuclear industry was healthy, but the Socialist Party of Japan was a strong opponent of nuclear power.

"But we are told that even within this party, the opposition to nuclear development decreased from 70 per cent to an estimated 50 per cent right now.

"This therefore gives a rather optimistic outlook for the Government to continue to pursue its policy for developing nuclear energy," the team reported.

In the United States, the Legco team observed that information on nuclear power generation was easily available.

There is no formal curriculum in schools on the subject, but both utility companies and federal agencies make available brochures, films and visit to plants.

Federal rules, regulations and orders are deposited in public document centres for inspection and research items are invariably made available for public comment before they are finalised.

The Legco team was in the United States after the Chernobyl accident and as the Three Mile Island No 1 Unit re-started after a scheduled shutdown.

The population around Shoreham were putting up strong resistance against the licensing of the plant for operation, and there were sporadic demonstrations, such as one at the Zion plant near Chicago.

The team met the Natural Resources Defence Council, a non-government organisation funded by private donations devoted to the preservation of natural resources.

The council, which has been kept informed of the development of nuclear energy in China, believes good management depends on strong regulatory capability, such as that in the United States.

The amount of money China spends on training and on setting up a regulatory body will have an important bearing, the council said.

They said arrangements would have to be made by Hongkong with China for contingency planning, monitoring of radiological release, exchange of information, and assistance in emergency relief in the event of an accident.

The emphasis, they said, would be on minimising risks, and Hongkong should make as many demands on China as possible.

The Legco team which visited Harrisburg visited the spokesman for the "Three Mile Island Alert," one of the groups fighting against the restarting of the Three Mile Island No 1 Unit.

The group challenged the management integrity of the utility company, citing the conviction of plant personnel for falsifying monitoring information before the plant's Unit 2 accident.

The group said the amount of radiological release was unknown because it was based on measurements taken by government and the company alone, without any independent monitoring.

Equipment Problems Feared

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 16

[Text]

ONE OF the worries critics have cited about the Daya Bay plant is the possible problem of a combination of British and French equipment.

In France, both the reactors are manufactured by Framatome while the generators are from Alsthom.

While it is a fact that the British GEC group has never produced the exact type of generators to be installed at Daya Bay, the combination of equipment from different companies "does not cause any significant interface problem in assembly and operation," the US delegation was told.

Individual officials of the Nuclear Regulatory Commission told the Legco delegates that they believed the French safety standards, although comparable to the American, were more stringent.

This is because in France, nuclear reactors are manufactured by one company (Framatome) and operated by one utility (Electricite de France). Therefore, requirements are standardised.

In Japan, the Legco delegation was impressed by the country's nuclear safety research and development.

The delegation visited a research centre of the Japan Energy Research Institute at Tokai which was set up in 1956.

Research programs were launched at considerable cost to study reactor safety, accidents caused by loss of coolant, nuclear fuel cycle safety, environmental safety, nuclear waste disposal and so on.

The Japanese, however, conclude that all containments are safe so far and do not attach too much importance to the sand filter feature now being adopted in France and under study by the Americans.

Discussions in Japan, U.S.

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 17

[Text] Accidents

THE Legco missions to Europe, the United States and Japan pointed out that all nuclear countries recognised the inevitable risk of human error when drawing up safety plans.

"Fundamental to the nuclear industry's approach to safety is the recognition that no human enterprise can be entirely risk-free," the councillors said.

They felt nuclear power development should therefore be accompanied by a parallel awareness of the need for strict standards and regulations governing design, construction, operation and maintenance to ensure the health and safety of plant workers and the public.

After meetings with overseas nuclear experts from Europe, the United States and Japan, in addition to officials from the International Atomic Energy Agency, Legco members said stringent requirements on safety standards and regulations would provide the primary level of protection against the consequences of a nuclear plant accident.

The report suggested establishing a national accident response headquarters in China which could give support to the Daya Bay plant and elsewhere in the event of accidents.

Access

The report also suggested setting up direct access to the computer data links to be offered by the Electricite de France.

The Umelco delegations placed it as a top priority after studying facts about nuclear accidents and contingency planning. The following were some of their findings:

IN EUROPE

The delegation accepted that nuclear installations like all industrial facilities were subject to incidents and accidents, and the objective of nuclear safety was to reduce accident probabilities and limit their consequences.

The safety analysis of nuclear plants is normally based on the "defence-in-depth" concept, which defines three levels of safety that characterise the design of light water reactors, from when the plant starts to operate commercially.

- First level: maximum inherent ability of the plant to function safely during normal operation through design and quality of fabrication.
- Second level: incorporation of protection systems capable of minimising the effects of abnormal transients or incident events.
- Incorporation of engineered safety features capable of mitigating the effects of postulated accidents.

On emergency planning, the primary level will concentrate on maintaining high standards and strict regulations on structural design for protection against the consequences of nuclear mishap and the second level concerns protection from radiation.

The planning must aim at limiting the immediate dose associated with the passage of a radioactive plume and the longer-term ingestion dose via the agricultural and water pathways in the event of an accidental release of radioactive materials to the environment.

Adequate emergency planning and preparedness arrangements should include:

- Emergency plans that specify precise and consistent response action.
- Review, approval and testing of such plans by the regulatory authorities.
- Close co-ordination between nuclear power plant operators and public authorities.
- Off-site emergency plans based upon a technical assessment of the various categories of accidents that could occur.
- Establishment of emergency planning zones based on realistic dose projections for implementing the appropriate off-site protective measures.

IAEA nuclear experts in Vienna told the delegation emergency plans should be designed to take specific account of the type of facility and to deal with a wide spectrum of possible accidents rather than a single reference accident.

The essential feature of the plans was to present a flexible framework for action and enable details of the action to be made specific to the particular accident event sequence.

Emergency planning arrangements should be completed sufficiently in advance of plant commissioning, and preferably before fuel loading starts, to allow adequate training and exercising of personnel in their emergency duties.

IAEA officials also told the delegation that most countries had two emergency plan zones – areas within 10 km radius and those outside the 10 km radius.

THE UNITED STATES

The delegation found the Three Mile Island incident report to the President's Commission made reference to 40 accidents that had occurred in nuclear reactor facilities worldwide.

Out of the total, 22 resulted from equipment failure, 10 from human failure and seven involved both.

Following the Three Mile Island incident, US nuclear authorities accepted 81 items of improvements on nuclear energy production covering the following aspects:

- Upgrading of reactor operator and senior reactor operator training and qualifications.
- Overhauling of regulatory practice and procedures.
- Increased and improved technical communications.
- Improved emergency communications.
- Modification based on the human engineering of controls and the control rooms.
- Installation of more instruments to monitor reactor system condition.
- Installation of new facilities such as radiation monitoring and water level instruments in the containment buildings to better prepare them for emergencies.

The United States' Federal Regulations also laid down a standard emergency classification and action level system for accidents based on facility system and effluent parameters adopted by the nuclear facility licensee.

Unusual

Four classes of emergency action levels are established:

- Unusual Event – Specific situation recognised as creating hazard potential not previously existing. No release of radioactive fission products but must be reported to Nuclear Regulatory Commission's (NRC) Incident Response Centre.
- Alert – Event with potential or actual substantial lowering of safety level of the plant. There may be radiological releases up to one rem (whole body) off-site.
- Site Area Emergency – Events invloving major failures of plant functions needed for the protection of the public. Off-site dose may be up to five rem.
- General Emergency – Events in the reactor involving imminent or actual substantial core degradation or core melting. Off-site doses may be greater than five rem: protective measures of population and environment are necessary.

In response to nuclear accidents, the United States has set up NRC Incident Response Centre with its headquarters in Bethesda, Maryland, and is manned 24 hours a day by staff who are technically qualified to deal with emergency reports.

IN JAPAN

Every year Japan holds its drills for emergency response today as the day for prevention of nuclear disasters.

The drills involving mainly Government agencies and utilities employees aim to check that the communication network between agencies is in order.

There have been no serious nuclear failures or accidents throughout Japan's 30-year history of nuclear development.

In 1984, there were 18 minor failures and incidents, with an average rate of incidents per reactor at 0.6, the lowest since 1966, while the operation rate of nuclear power plants recorded the highest-ever rate of 73.9 per cent.

The number of Japanese plants which closed because of breakdowns averaged 0.1 per year, one digit less than the United States and other countries.

In Japan, a law requires that the central Government, local governments and power utilities work together to draw up emergency plans for accidents in a nuclear power plant.

Statistics on Risks

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 17

[Text] Environment

COALMINERS face a much higher risk of dying as a result of their work than staff who manufacture electricity using nuclear energy, according to the Legislative councillors' report.

The report, which sets out comparative risks and then calculates loss of life expectancy, reveals that a coalminer will lose 1,100 days from his life while a radiation worker will lose only 12.

The statistics, from University of Pittsburgh professor of physics, Dr Bernard Cohen, also claim that people who smoke one packet of cigarettes a day will lose 1,600 days off their life expectancy, while those who spend their entire life near a nuclear power plant will lose just 0.4 of a day.

The councillors' fact-finding missions collected information on the harmful affects radiation could have on health and the environment, from the United States, Europe and Japan.

Although some information from the three countries conflicts, there is little criticism of the affects radiation exposure might have on the environment.

US authorities even say that aquatic life around one turbine plant has improved because high temperatures discharged from the plant have warmed surrounding water temperatures.

And Japanese authorities say although people exposed to extreme levels of radiation may develop leukaemia, there is no link between radiation and cancer.

A report from Europe says nuclear power stations certainly involve no more risk – in fact are probably less of a risk – to the community, than oil or coal burning systems.

"Two hundred tonnes of uranium fuel are required to operate a 1,000-mw power plant using a light-water reactor for one year, generating sufficient electricity to supply a town of one million people," the European experts said.

"A fossil-fuelled (oil or coal) plant of this capacity burns about two million tonnes of anthracite coal, or nine million barrels of oil, a year."

The three reports reveal there is no international standard on the limit of radiation to which a person can safely be exposed.

During normal operation of a nuclear plant, United States authorities set exposure limits to 25 millirem per person per year.

In Japan however, the safety level of radioactivity for the public is set at 500 millirem a year, but the level of additional radiation given out by a nuclear power plant to the surrounding area can not be above five millirem per year.

The Tokyo Electric Company told Hongkong's Legislative councillors that during the first few years of operation, there was some leakage of low level radioactive material from a number of nuclear power plants.

"But since then the radioactivity around the plants has been so low that it could not be detected," the report says.

All countries surveyed by the Legislative councillors have sophisticated monitoring systems – with radiation detectors located on the nuclear power station sites and in surrounding districts.

But all face the common problem of waste disposal.

While the US has solved the technical issue of waste disposal, there has been no solution found to the political issue of where the waste should be stored, according to the report.

Low-level waste, such as contaminated clothes, gloves, boots and other items used in the nuclear power station, are stored in special containers buried underground.

But there is an inter-state controversy as to where high-level radioactive waste should be stored.

Three storage spaces have already been selected by the federal authorities but the states concerned have refused to accept the high-level radiation waste.

Safety Measures Discussed

Hong Kong SOUTH CHINA MORNING POST in English 11 Sep 86 p 17

[Text] Safety

IN the discussion on safety, the critical question in the minds of the visiting Legislative Council members is whether the containment building of a reactor can be destroyed in the worst accident scenario thus leading to a large release of radioactivity.

Experts in France, Austria, the United States and Japan are unanimous in their views that the integrity of a Pressurised Water Reactor (PWR) containment is difficult to challenge.

This safety feature also makes the Chernobyl type of accident very unlikely to occur at a PWR plant.

Mr M. Rosen, safety director of the International Atomic Energy Agency, added that it was hard to visualise a containment release in a water reactor.

The reactor building of the Chernobyl nuclear power plant was not designed for containment purposes.

Moreover experiments carried out in France have shown that even if cracks were to appear on the containment wall due to sustained presure build-up beyond 12 bars within the containment, the crack would act as a filter which would greatly reduce the volume of radioactive release.

The containment wall would then seal itself off after the release of pressure from within the containment due to the characteristics of prestressed concrete.

The French also told the delegation that a sand filter system would be able to limit the amount of radioactive substance released in case of an accident.

This system allows a release of pressure under controlled conditions to bring the pressure inside the containment building down to the safety limit.

The radioactive gas released wil! then pass through the sand-filter system before going out into the atmosphere.

The usefulness of this system was confirmed by Mr Rosen.

(This additional feature, however, was not included in the Daya Bay contract, but the French said the Chinese could choose to include it later).

In Japan, the delegates were told that the Japanese had no intention of putting this feature into their reactors because they considered their containment strong enough.

In the US, Mr Donald McPherson of the Department of Energy said that a Chernobyl-type accident "could not" occur in a PWR plant.

The US delegation was also told that the Western-type water reactor was a stable system because it used water rather than graphite as coolant.

Graphite can be ignited — water cannot.

The US discussion was heavily dominated by the much-publicised Three Mile Island accident of 1979.

During the accident, the average dose of radioactive release was less than eight millirem to the population within 16 km of the plant.

This was a very low level of radiation compared with the normal background radiation of around 100 millirem.

The US experts said the accident showed the effectiveness of the threefold security of the water reactor.

Nevertheless, much research was done on the safety aspects of nuclear plants following the accident.

One design philosophy in nuclear power plants is "defence in depth" which is stressed by both the French and the Americans.

This philosophy simply means the plant has to be designed with the assumption that everything within reason goes wrong at once — including mechanical failure, loss of electricity supply, human error etc — yet there is still a backup system to prevent disaster.

The Legco report quoted Dr Bernard Cohen's book *Before It's Too Late — A Scientist's Case for Nuclear Energy:* "One sometimes hears statements to the effect that reactors are safe if everything goes right but if any piece of equipment fails or if an operator makes a mistake, disaster will result.

"This statement is absolutely wrong. In reactor design, it is assumed that all sorts of things will go wrong — pipes will break, valves will stick, motors will fail, operators will push the wrong button etc, but there is defence in depth to cover these malfunctions or series of malfunctions."

Staff Already Training

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 17

[Text] Training

CHINESE personnel are already working in the US Nuclear Research Centre to gain experience in nuclear reactor safety matters in preparation for Daya Bay, Legco's fact-finding mission to the US was told.

And the mission to Europe learned that staff operating the Daya Bay plant would receive the same training as those working in French nuclear stations.

The councillors' report on their overseas trips also reveals that the training and retraining of staff operating nuclear plants had been given very high priority in every country visited.

In France, the Legco mission was told: "Without a team of competent staff, no nuclear power plant, even those with the best design in the world, can be operated safely."

Various teaching aids – including machines which simulate 800 different accident scenarios – are used in French training programmes.

For one week each year, staff also undergo refresher courses during which they are updated on recent incidents and developments concerning nuclear power.

French engineers told the Legco mission that the Chinese engineers they had worked with were highly perceptive and had had no problem grasping the theories of nuclear power regulation, but added that they did need more on-the-job experience.

Potential staff for Daya Bay are to receive the first part of their training in China. Then 113 of them will go to Europe, mainly France, to complete training.

In addition, the French authorities will produce training programs for each function at the Daya Bay plant and provide suitable teaching aids.

One such aid will be a replica of the power plant's control room which will be installed at the Daya Bay site for training purposes.

Chinese staff trained in France will undergo refresher courses in China.

The Legco mission to the US learned that nuclear plant operators underwent more frequent re-training there than in Europe. Most plants gave workers one week's retraining every four to six weeks.

The mission was told that Chinese personnel would participate in staff training courses in the US and work within training centres there to gain experience.

Secrecy Not Justified

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 p 14

[Editorial: "New Debate Needed on Daya Bay Project"]

[Text]

THE report by the Legislative Council's fact-finding missions overseas on nuclear power were presented at the weekend, and several conclusions emerge from a first reading. The compilers of the report appear to assume that it is a foregone conclusion the Daya Bay plant will be built; they could make no sensible assessment of the economics of the plant except to request reassurance that Hongkong would not be charged excessive tariffs for power; that they had some reservations about plant management and safety which led to a number of reasonable recommendations ("observations", rather, so as not to upset Chinese susceptibilities) as to safety, monitoring, regulation and contingency plans. One of the "observations" takes up the suggestion this newspaper made some time ago that an independent advisory body with responsibility for safety and regulatory control of Daya Bay be set up with Hongkong participation.

So far, so good. The report is a safe, sensible document, and it is of limited value. It does little to answer some of the fundamental questions raised by the people of Hongkong. It adds not very much to the public debate about the safety and future maintenance of the plant, and absolutely nothing to the public's understanding of the economic justification for Daya Bay. By backing the Government line that the decision to build the plant is a matter for China, it is unlikely to encourage Beijing to take into account the concerns of Hongkong. The public worry about

Daya Bay is linked to doubts as to the extent China will recognise the legitimate concerns of the Hongkong people, or take public opinion into account, when this city becomes part of China after 1997.

Lost in the debate seems to be the fact that the idea for Daya Bay originated from Hongkong, that the power it generates will be sold to Hongkong, that the project has the backing of the Hongkong government and one of the territory's major hongs, and that if it had not been for Hongkong's active interest and support, the project would never have got this far. There is still serious debate in Beijing about future energy requirements and the direction the country's energy policy will take, but of course, now that politics has entered the fray, the matter is more complicated. On the one hand, the people of Hongkong have used Daya Bay as a symbol of protest about decisions over which they have had no control, and the depth of their concern is shown by the opinion polls and petitions with a million signatures; on the other hand, face for China is now involved and it cannot be expected to react kindly to outsiders telling it what it can or cannot do. Of these two conflicting demands, it is not difficult to predict which will win out. Thus have economics and politics intertwined to complicate what began as a safety issue. It is much more, and if it is treated solely as a nuclear safety matter, any debate is misdirected.

Attention would be better focused on not what should be done, but how. Will it be done with style, with some concessions to the concerns of Hongkong, or will it be bulldozed through as it had been until Chernobyl changed the face of nuclear power forever? The prognosis is not encouraging. Much obfuscation has gone on over Daya Bay. The public is a little better informed now, but there are still several areas where it has been kept in the dark. The confidential risk assessment report prepared by the United Kingdom Atomic Energy Authority at the request of the Hongkong Government, published by this newspaper last month, revealed a degree of inadequacy which prompted some government alarm. At the time the flawed report was received, it was reassuring the public that all was well. The Lazard Bros study on the economics of the project is still secret, and the Legislative Councillors when compiling the public relations handouts they had collected did not feel able to address this vital question. Economically, is Daya Bay good for Hongkong or not? We simply do not know.

So where do we go now? Mr Martin Lee's request for another special debate by the Legislative Council seems perfectly reasonable. Surely the whole object of the overseas missions was to gather information for public discussion and debate. Questions still remain to be answered, matters need to be aired. Now the report has been prepared, and with the signing of the contracts only weeks away, it is time to bring the issue into the public arena again. It was clearly understood that further consideration would be given to it when the report was finalised, yet so far the Government has turned down Mr Lee's request. He is now expected to try to force a debate at the "in house" meeting of Legislative Council members on Wednesday. It is difficult to understand the Government's reluctance: some may come to the conclusion that it still has something to hide. The best way to dispell that is for the whole matter to be opened to discussion. Secrecy is not justified on a matter of such intense public interest.

Analysis by Albert Chan

Hong Kong SOUTH CHINA MORNING POST in English 1 Sep 86 pp 1, 2

[Article by Albert Chan: "Piles of Much Needed Detail--Six Years Late"]

[Text] The 213-page report on the Legislative Council's nuclear fact-finding trip may be dismissed as a public relations exercise for the pro-nuclear camp, but sadly it has taken six long years for the people of Hongkong to be given such a detailed document about the nuclear energy issue.

Hongkong was told about the Daya Bay project as early as 1980 when China Light and Power Company disclosed that it was conducting a feasibility study with the Chinese authorities.

For China Light's chairman Lord Kadoorie, nuclear power was the answer to Hongkong's burgeoning demand for electricity. For China, construction of the plant was an answer to its thirst for Western technology.

Six years have passed and the shadow of Chernobyl is hanging over the nuclear industry and only now, within weeks of the contracts being signed for construction of Daya Bay, is a fairly detailed document on aspects of nuclear energy available to the people of Hongkong.

The Legco document makes important observations about safety aspects, possible accidents and remedies, emergency planning, public education on nuclear power plants, and so on.

It says nuclear accidents can happen, but attempts to substantiate with technical proof that a disaster of the kind which devastated Chernobyl cannot happen at Daya Bay.

Such specific information might never have been made available had it not been for Chernobyl which spurred Legco members to action--such an analysis was not made available by the Chinese Government, the Hongkong Government or China Light and Power.

The Hongkong utility and its Chinese partner, which now operates as the Guangdong Nuclear Power Joint Venture Company, have probably had for years most, if not all, the information collected by the Unofficials [as published] in France and Austria.

Why did they not take a more positive approach and release the information the public sought?

A large part of the Legco report comes straight from the brochures provided by the various organisations the delegations visited.

Most of these brochures were readily available to the public in the respective countries.

What about the people of Hongkong and China?

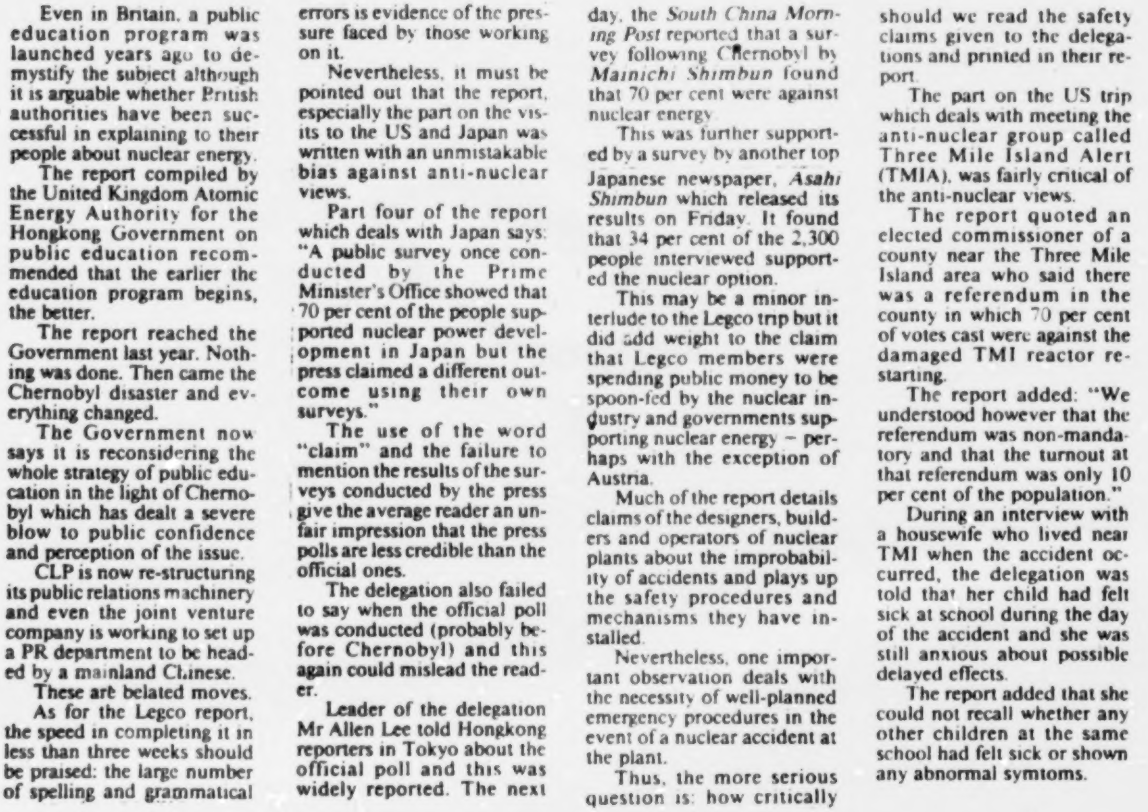
A top official at the joint venture company admitted that China was a long way behind Western nuclear nations in public education on the issue, and one can only wish the Chinese authorities can do a bit of catching up now that the nuclear stations in Qinshan near Shanghai and Daya Bay are well under way.

As for Hongkong, both the Government and China Light and Power had for years insisted that the plant was to be built in China and that as the Chinese had a majority (75 per cent) stake in it, it would be "inappropriate" to come forward as a kind of spokesman on the project.

However, the fact remains that a Hongkong company is in the joint venture and that Daya Bay is 50 km from the heart of the territory and its six million inhabitants. Hongkong and its people have a right to comment.

In France, the United States and Japan, the case was different.

The public relations work of the French, in particular, must be commended. Information on the projects, the risks and possible problems were discussed in public inquiries before plants were built.



Even in Britain, a public education program was launched years ago to demystify the subiect although it is arguable whether British authorities have been successful in explaining to their people about nuclear energy.

The report compiled by the United Kingdom Atomic Energy Authority for the Hongkong Government on public education recommended that the earlier the education program begins, the better.

The report reached the Government last year. Nothing was done. Then came the Chernobyl disaster and everything changed.

The Government now says it is reconsidering the whole strategy of public education in the light of Chernobyl which has dealt a severe blow to public confidence and perception of the issue.

CLP is now re-structuring its public relations machinery and even the joint venture company is working to set up a PR department to be headed by a mainland Chinese.

These are belated moves.

As for the Legco report, the speed in completing it in less than three weeks should be praised: the large number of spelling and grammatical errors is evidence of the pressure faced by those working on it.

Nevertheless, it must be pointed out that the report, especially the part on the visits to the US and Japan was written with an unmistakable bias against anti-nuclear views.

Part four of the report which deals with Japan says: "A public survey once conducted by the Prime Minister's Office showed that 70 per cent of the people supported nuclear power development in Japan but the press claimed a different outcome using their own surveys."

The use of the word "claim" and the failure to mention the results of the surveys conducted by the press give the average reader an unfair impression that the press polls are less credible than the official ones.

The delegation also failed to say when the official poll was conducted (probably before Chernobyl) and this again could mislead the reader.

Leader of the delegation Mr Allen Lee told Hongkong reporters in Tokyo about the official poll and this was widely reported. The next day, the *South China Morning Post* reported that a survey following Chernobyl by *Mainichi Shimbun* found that 70 per cent were against nuclear energy.

This was further supported by a survey by another top Japanese newspaper, *Asahi Shimbun* which released its results on Friday. It found that 34 per cent of the 2,300 people interviewed supported the nuclear option.

This may be a minor interlude to the Legco trip but it did add weight to the claim that Legco members were spending public money to be spoon-fed by the nuclear industry and governments supporting nuclear energy – perhaps with the exception of Austria.

Much of the report details claims of the designers, builders and operators of nuclear plants about the improbability of accidents and plays up the safety procedures and mechanisms they have installed.

Nevertheless, one important observation deals with the necessity of well-planned emergency procedures in the event of a nuclear accident at the plant.

Thus, the more serious question is: how critically should we read the safety claims given to the delegations and printed in their report.

The part on the US trip which deals with meeting the anti-nuclear group called Three Mile Island Alert (TMIA), was fairly critical of the anti-nuclear views.

The report quoted an elected commissioner of a county near the Three Mile Island area who said there was a referendum in the county in which 70 per cent of votes cast were against the damaged TMI reactor restarting.

The report added: "We understood however that the referendum was non-mandatory and that the turnout at that referendum was only 10 per cent of the population."

During an interview with a housewife who lived near TMI when the accident occurred, the delegation was told that her child had felt sick at school during the day of the accident and she was still anxious about possible delayed effects.

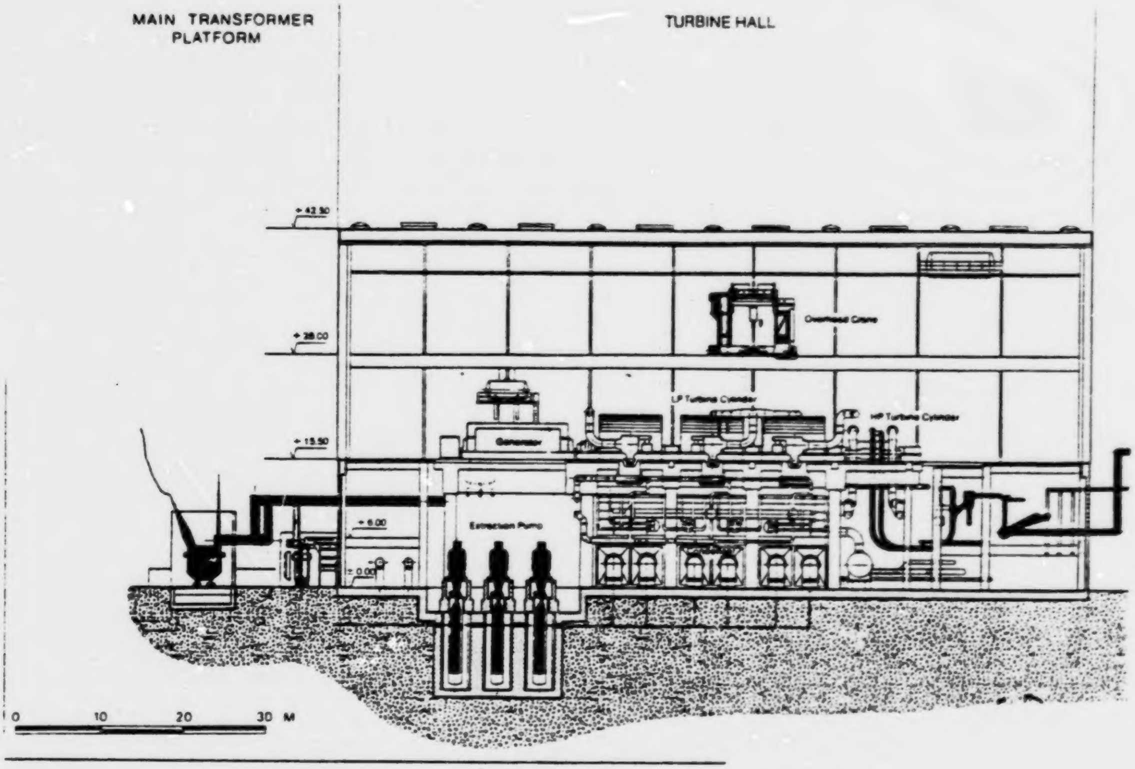
The report added that she could not recall whether any other children at the same school had felt sick or shown any abnormal symtoms.

The woman told the delegation she would not leave and live further away because she did not want to leave her home town.

Such comments show that the Legco delegates were critical of the claims made by anti-nuclear groups or individuals but were they equally critical – or rather did they have the expertise to be critical – of the claims about safety and technical specifications made by the pro-nuclear faction?

The report is persuasive – it leaves an unmistakable impression on the reader that Daya Bay will be built and that it will be safe. However, it must be read cautiously, in critical perspective.

A cross section of a typical French nuclear power plant similar to the one that is to be built at Daya Bay. Below is an enlargement of the reactor vessel.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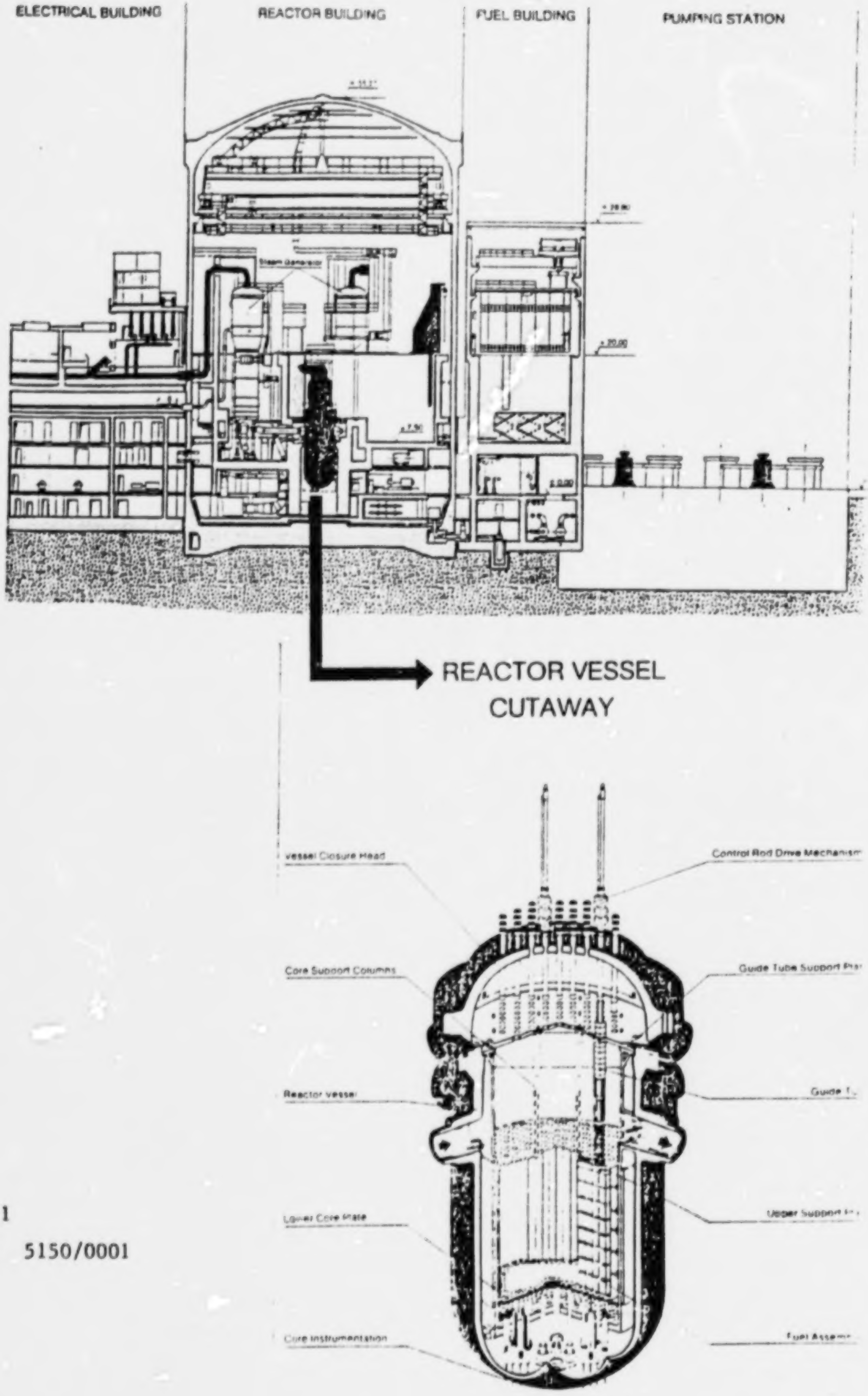
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REPORTAGE ON ANTINUCLEAR LOBBYISTS' PRC VISIT

Official Receives Protest

Hong Kong SOUTH CHINA MORNING POST in English 21 Aug 86 p 9

[Article by Albert Chan]

[Text]

THE stalemate between militant anti-nuclear lobbyists from Hongkong and their Chinese hosts in Beijing was broken yesterday when Mr Li Hou, the second most senior official in the Hongkong and Macau Affairs Office, met the protestors.

He accepted their petition with over one million names on it calling for the scrapping of the Daya Bay nuclear plant.

The breakthrough came despite blunders made by the Hongkong group a day before which angered the Chinese officials and resulted in a rare retort in the official news agency report.

Even since their arrival in the Chinese capital on Monday, the 12-member Hongkong delegation has persistently demanded that they hand in petition letters and eight boxes of signatures – to none other than Premier Mr Zhao Ziyang and Mr Ji Pengfei, head of the Hongkong and Macau Affairs Office, a top policy branch within the State Council.

They had threatened to boycott visits to nuclear installations arranged by their Chinese hosts and bring the signatures and petition back to Hongkong if their demand was not met.

But Chinese officials, who formed a reception committee to look after arrangements of the Hongkong group, said neither Mr Zhao nor Mr Ji were in Beijing and the Hongkong group may get a chance to meet their deputies.

The Hongkong group refused to accept any alternatives and was reportedly told by the Chinese that failure to deliver the petition to the reception committee yesterday afternoon, as requested, would result in cancellation of a planned farewell banquet

The cancellation would have been a major breach of Chinese etiquette and would have indicated a near-final break between the petitioners and Chinese officials.

The one million signatures were collected in a recent campaign in Hongkong and the anti-nuclear lobby was set up to press Beijing to scrap the $27 billion Daya Bay nuclear plant that is to be built 50 km northeast of Hongkong.

'Irked'

Yesterday afternoon, in front of a barrage of photographers and reporters, Mr Li emerged to receive the two petition letters – one addressed to Mr Zhao and another to Mr Jiang Xinxiong, Minister of the Nuclear Industry.

He said he was assigned by the State Council to accept the petition and agreed to pass them to "leaders of the State Council."

Mr Li then left without speaking to the Hongkong protestors.

On Tuesday, blunders and offensive remarks made by the Hongkong delegates had angered the Chinese authorities so much that its official newspaper and news agency sent dispatches saying that the Chinese were "irked" by "inappropriate views" expressed by the group.

The news dispatch was considered unusual as the Chinese would rarely criticise their guests in such a direct and open means and the top leaders in Beijing appeared to be losing patience with the Hongkong group.

The incident occurred minutes after a guided tour of an experimental nuclear reactor on the outskirts of Beijing which the Chinese are proud of.

But the Hongkong delegates said the reactor could not be compared with the one to be built at Daya Bay which is for commercial use and has a much larger capacity.

They also declared their anti-nuclear position outside the prestigious China Atomic Science Research Institute where the reactor is located.

The same evening, the semi-official China News Service sent out a dispatch which said the Hongkong group were 30 minutes late for a meeting and some members "became impatient" during the meetings with nuclear experts.

As for the visit to the research institute, the dispatch said Mr Zhang Zhenghua "gave the Hongkong visitors a warm welcome but the representatives of the group delivered some inappropriate opinions which angered the hosts."

"Mr Zhang said he felt sorry about the incident," the dispatch added.

Mr Zhang then criticised the Hongkong group for "a lack of knowledge" in their comments.

Meanwhile, yesterday's *People's Daily* confirmed an earlier report by the *South China Morning Post* that China is willing to allow experts from the International Atomic Energy Agency to inspect the Daya Bay nuclear plant.

Team Returns to Hong Kong

Hong Kong HONGKONG STANDARD in English 22 Aug 86 pp 1, 22

[Article by Andy Ho]

[Text]

A FURIOUS anti-nuclear delegation returned from Beijing late last night and pledged to "fight on" for the shelving of the Daya Bay nuclear project.

The head of the 12-man team, the Rev Fung Chi-wood, said his group is not convinced by the Chinese experts and still have the same anxieties over the nuclear installation as before.

He told *The Standard* that their mission has been distorted by the mainland press, which has "tailored the groups' speeches to suit their own needs."

A *China News Service* report last Wednesday quoted the Rev Fung as saying that they were satified with the result of their mission.

He said he did not recall having made any remarks to that effect and had only described their trip as a "partial success."

Said the Rev Fung: "We are glad that we handed over the one-million signature petition to a State Council official, but we are very disappointed that the arrangement was made only after much bargaining."

The Chinese leaders conceded to have the vice-director of the Honkgong and Macao Affairs Office, Mr Li Hou, to receive the petition only after the group threatened to bring the signatures directly to the office of the State Council, he added.

The signatures were presented at the Beijing Science Hall.

Another member of the group, Mr Anthony Ha, said the officials advised them that a direct petition to the State Council would breach the "Beijing norms."

The group accepted the new arrangement because they thought that "dialogue is better than confrontation."

But it turned out that there were little chance for "genuine dialogues," said the Rev Fung.

He said most of their activities arranged by China were either guided tours or presentations of prepared speeches.

In the five-day stay, they were only allowed less than an hour to raise questions relating to Daya Bay, during which they managed to ask about eight questions.

The Anglican priest is also critical of another report *China News Service*, headlined "Hongkong Citizens' Nuclear Phobia is Fading" which quoted him as saying the trip was an "eye-opener" and that he "appreciated" China's achievements in nuclear technology.

He said he only told the host after the visit he "has a better understanding of the nuclear research in China."

The activists were given a warm welcome by leaders of the 115-group anti-nuclear united front on their return.

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HONG KONG FACES DANGERS OF NUCLEAR CONTAMINATION

Hong Kong HONGKONG STANDARD in English 29 Aug 86 p 6

[Editorial: "Food, Water and Radiation Don't Mix"]

[Text]

THERE are some aspects of the Legislative Council fact-finding mission's report on nuclear plant safeguards that may leave a bitter taste in the mouths of all who read it.

This is more than just a figure of speech. We are talking about those passages in the report that refer to contingencies which could have a direct bearing on the food we eat and the water we drink.

One of these *observations* from the secret report printed in yesterday's *Hongkong Standard* stresses the importance of "studying the possibility of atmospheric dispersion of radioactive release affecting the reservoirs and sources of water supply in Hongkong."

This is, in fact, a very crucial point. Hongkong relies for its water needs basically on two sources — water from the sky and water from the East River.

Another of the report's *observations* has to do with "contingency actions on food and water to be taken within a radius of 50 kilometres (50 miles in the United States) from the nuclear plant."

Long before the planned Daya Bay nuclear plant loomed menacingly over our northern horizon, water was a bone of contention here.

And large open reservoirs, such as the one at High Island, have long played a vital role in supplying Hongkong's water needs.

A glance at the map reveals that some of these reservoirs lie well within the 50-mile radius mentioned in the report.

It would seem to the layman that water must be one of the most easily contaminated elements.

Contamination will adhere to some solid substances, such as glass, we are told, and may therefore be removed. Other solid elements, such as wood, will absorb radiation.

When it comes to water, however, the radioactive substance, if it is soluble, will be distributed evenly throughout the lake, reservoir or whatever.

There are, however, no internationally accepted standards which tell us how high the radiation level must be before a body of water is rendered useless for bathing and drinking.

Whatever happens, however, it would be impossible to block off the area for six million people. If the water is rendered useless, you can forget about Hongkong.

Another *observation* in the Legco mission's report stresses the importance of "taking actions to ensure that the food supply to Hongkong will not be contaminated and drawing up measures to be taken if contamination occurs."

This also is a vitally important point for Hongkong since we get so much of our food from China.

This food, including vegetables, poultry, fish and pork, basically originates in China's Guangdong Province — and much of it from areas well within the 50-mile limit.

The Legco mission's report also deals with the safety aspects of Pressurised Water Reactors (PWR).

It tells us that the PWR type of reactor, as is proposed for Daya Bay, "is designed and will be constructed in such a way that even in the event of a worst accident resulting in a core meltdown, the containment building will be able to contain most of the radioactive products."

Readers of the report would, we are sure, have been much more re-assured if a stronger guarantee had been offered than the somewhat less than definitive phrase, "*most of* the radioactive products..."

The report adds that it is "more than unlikely" that an accident like the one that took place at the Chernobyl plant earlier this year would happen to a PWR."

Here again, the average reader would probably have preferred a stronger guarantee than the rather wishy-washy phrase "more than unlikely."

For our part, we would be much happier to learn that it would be "totally impossible" for a Chernobyl-type disaster to happen here.

None of this means that we do not realise that China needs nuclear energy. It is, after all, one way of bringing that country up-to-date in terms of technology.

We have made it clear in the past that we are not against the idea of China going nuclear.

If Beijing needs a nuclear power station in Southern China this is no concern of ours. China is entitled to it.

We do not, however, want to see a nuclear power plant located too close to Hongkong. And Daya Bay is, in our view, much too close.

This is borne out by the references in the Legco mission's report to a 50-mile radius for contingency actions on food and water.

We believe that China should consider re-locating the Daya Bay plant.

We realise that this would be an expensive proposition. But if China does not want to lay out this extra money, Hongkong should consider paying the difference.

In the meantime, we still believe that the Daya Bay plant should be the subject of a public discussion here. And that discussion should be held as soon as possible.

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ANTINUCLEAR LOBBY TOLD NO STOPPING OF DAYA BAY

Hong Kong SUNDAY STANDARD in English 17 Aug 86 p 1

[Article by Andy Ho]

[Text]

TOP executives of the Hongkong Nuclear Investment Company (HKNIC) have told the anti-nuclear lobby in unequivocal terms that the company is determined to go ahead with the Daya Bay project and has no intention of backing out in the face of public pressure.

The company's chairman, William Stones, confirmed yesterday that major construction and equipment supply contracts for the $27.3 billion installation will be signed in mid-September.

The Chinese State Council is scheduled to ratify the Guangdong Nuclear Power Joint Venture Company's commercial agreements with foreign contractors on October 7.

HKNIC, a full subsidiary of China Light and Power Company (CLPC), is a 25 percent partner in the Joint Venture Company. A total of 70 percent of the power output of the future Daya Bay plant, which will have a capacity of 1,800 megawatts, will be sold to CLPC for local consumption.

Mr Stones met five leaders of the Joint Conference for the Shelving of the Daya Bay Nuclear Plant at the CLP headquarters yesterday morning — on the eve of the departure of the group's leaders for Beijing for face-to-face talks with the Chinese leadership.

He estimated that, compared to a coal-fired station to be built here, the Daya Bay nuclear option will result in savings up to $33 billion over the first 20 years of operation.

His company thus sees no point in turning the nuclear facilities into a conventional power station, added Mr Stones, who is also the CLP managing director.

The convenor of the 110-group united front, the Rev Fung Chi-wood, told reporters that the meeting with HKNIC officials was a "friendly" one.

But he said he was not convinced by the company's arguments as they were not substantiated with detailed figures, the Anglican priest said.

He urged HKNIC to explain to the public in layman's terms how it has come to the conclusion that nuclear power is more economical in the long term.

Their demand for an immediate release of all HKNIC reports on the financial aspects of the project was rejected at the meeting.

The company officals insisted that such data were not only commercially sensitive to CLPC and HKNIC but to its Chinese partners as well.

The group's call to terminate the power purchase contracts until the consumers are assured of a low-cost nuclear power supply was also rejected.

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WRITERS DESCRIBE START OF DAYA BAY PROJECT

Hong Kong SUNDAY STANDARD in English 17 Aug 86 p 7

[Article by Stephen Morgan and Sharmila Gopinath; first paragraph is SUNDAY STANDARD introduction]

[Text] In the second instalment of a three-part series on the energy economics and policy of the Daya Bay nuclear power plant, Stephen Morgan and Sharmila Gopinath look at the history of China Light and Power's affair with nuclear power. They also explain the methods used by the company for power forecasting.

HONGKONG'S involvement in a Guangdong nuclear power plant will go down in history as the ultimate dream of one man: the chairman of China Light and Power, Lord Kadoorie.

As much as reports point to the technical feasibility of the Daya Bay nuclear power plant, the original proposal had little to do with the economics of power or the need for electricity.

It was a wholly political ploy, the brainchild of Lord Kadoorie, who in 1979 successfully negotiated an agreement to sell electricity to China.

"It was always the wish of our chairman to trade with China," a company spokesman told the *Sunday Standard*.

That agreement was signed in March 1979 and the next month power began flowing to the system of Guangdong Power Company (GPC) in Shenzhen. During this deal the idea of a feasibility study was put forward.

An agreement was signed and CLP launched itself into the study, which would comprise five volumes when completed in November 1980, concluding that a nuclear power station was "technically feasible."

Copies of the report were delivered to Guangdong Power Company and to the governments of China, Britain and Hongkong. The Chinese were enthusiastic, according to Lord Kadoorie in the company's history *Power: The Story of China Light*.

"We gave 100 copies to the Chinese," he recalled. "They said they'd never seen a report like it before, and that it was of tremendous importance and interest since it set the way big projects should be investigated prior to embarking on them.

"As a result we gave them another 200 copies ..."

But the proposal was one Lord Kadoorie knew would be made or broken by governments, not power companies.

In a letter to the GPC accompanying these volumes, Lord Kadoorie wrote: "The proposal to build a nuclear power station in Guangdong Province to supply power both to Guangdong Province and Hongkong is a project of such importance and magnitude as to remove it from the level of ordinary commercial enterprise."

No truer word has been written. The agreement between CLP and GPC was without the approval of the Chinese government, and Beijing had considerable reservations about Guangdong as the site for a nuclear power plant.

Moreover, a major internal rift broke out between as many as 12 different ministries with an interest in the project, of which the prime conflict was between the Water Conservancy and Electrical Power Ministry and the Ministry of Nuclear Industry, both of which wanted the project to be their own.

CLP's 1982 annual report disclosed the draft agreement with GPC for the supply of power. Over 20 years CLP would take 60 percent of generated power (at first it was to be only 40 percent, and now 70 percent).

The foreign exchange earned from the sale of electricity would be used to repay the capital and interest charges on the international capital used for construction of the project.

Lord Kadoorie is quoted in the company history as saying that China Light's purchase of electricity would be sufficient to pay for the nuclear power station by 2009, at which time purchases of power could be reduced to 40 percent.

What this arrangement amounted to was a development fund to allow China to acquire foreign nuclear plant technology without having to spend any of its foreign exchange earned from conventional exports.

And what Hongkong got in exchange was security of its future.

Deputy chairman of CLP, Sir Sidney Gordon, is quoted in a report in the *Oriental Daily* of May 1982 saying political factors outweighed the interest of shareholders in assisting China to develop the Guangdong nuclear plant.

Joint Sino-Hongkong construction, he said, would strengthen relations and ensure the stability of Hongkong's future, and since CLP would buy the electricity which would pay for the plant, Beijing would not want to rock the boat of prosperity.

This thought is also attributed to Lord Kadoorie in the company history: "Obviously if the Chinese were to be paid in our dollars, they would want to be sure that this currency retained its value."

It is a reasoning that seems to have swept along all governments. During the August 1982 visit to Guangdong of Hongkong's governor Sir Edward Youde, the provincial governor told him that the State Council had approved the project and that it would be in Shenzhen at Daya Bay.

Two months later Sir Edward in his annual address to the Legislative Council disclosed that the Hongkong Government had agreed in principle to CLP buying electricity from the nuclear power station.

But the smooth sailing bumped into some turbulence in the shape of terse remarks by Prime Minister Margaret Thatcher during her visit to Beijing in late 1982, which kicked off the Sino-British talks on the future of Hongkong.

In 1983 Sino-British relations hit a low.

Although the Hongkong Nuclear Investment Company, a wholly owned subsidiary of CLP, was formed during the year, the formation of the Guangdong Nuclear Power Joint Venture Company (GNPJVC) — the owner and operator of the nuclear power station — in which it would hold a 25 per cent interest was put on hold.

A perceptive article in the Chinese journal *The Nineties* argues that Daya Bay became a political chip in the talks on Hongkong's future. Even more so since all the big nuclear vendors were after a piece of the action and CLP was keen for the General Electric Company to supply the generating set.

It was only the successful resolution which flowed from Sir Geoffrey Howe's trip to Beijing in April 1984, at which he relinquished all British claims to Hongkong after 1997, that the obstacles to the joint venture were removed.

Lord Kadoorie in the annual report for 1984 disclosed that the joint venture contract was about ready. Upon Mrs Thatcher's signing of the Joint Declaration on the Future of Hongkong in Beijing on December 19, 1984, the nuclear show rolled again.

In January 1985 Lord Kadoorie signed the joint venture contract in Beijing and the next month the GNPJVC was established. The basic cradle for the dream was in place.

Over the next two months it will be given full legal form with the signing of the Bank of China loan, the electricity take-off agreements, and three key contracts: with Framatome for the nuclear assembly, GEC for the generators, and Electricite de France for project services.

And the politics of the whole deal was eloquently expressed in a pamphlet reprinting a series of articles from the pro-Beijing *Da Kung Pao*. Far from threatening Hongkong's safety, the plant would bring benefits.

"In fact, China's main reason for building a nuclear plant at Daya Bay is to ensure Hongkong's later stable prosperity," it stated.

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DAYA BAY REPORTS DEMANDED BY LEGISLATORS LISTED

Hong Kong SOUTH CHINA MORNING POST in English 19 Aug 86 p 20

[Text]

LEGISLATORS and anti-nuclear groups are seeking to obtain copies of a long list of unreleased reports on the Daya Bay project.

Although the Government has released some information, the groups believe it holds a number of reports written some time ago on the nuclear power plant, and that it is awaiting new reports currently being compiled.

Both the legislators and the groups are particularly concerned that information on safety measures and economic aspects of the $27-billion project should be made public.

They named some of the reports which they are particularly anxious to see. These include:

● **Feasibility Study Report on Joint Development of A Nuclear Power Station in Guangdong Province:** Jointly compiled by the Guangdong Power Company and the China Light and Power Company in 1979 and 1980, the five-part study covers site selection, equipment, system design and financial and economic considerations.

Three volumes of the report were released to Legco – though not to the public – but the parts covering financial and economic aspects of the project were withheld. In addition, the volumes released had been cut and contained little on safety measures at the plant.

● **Lazard Brothers' report:** A merchant banking study commissioned by the Government several years ago to examine the economic justification for Daya Bay.

It was conducted to look into the financial implications of the scheme to ensure that it would benefit local consumers.

● **Report on Umelco's overseas nuclear fact-finding trip:** Currently being compiled by delegates who recently went to Europe, the US and Japan to gather information on overseas nuclear plants.

Leader of the fact-finding missions, Miss Maria Tam, said upon her return to the territory last week that the delegations would compile a report within six weeks.

Umelco has said it will submit the report – which will include a contingency plan – to the Government, but it is not yet clear whether it will be released to the public.

● **Reports by the Harwell Consultants:** Compiled by United Kingdom Atomic Energy Authority (UKAEA) consultants at Harwell as part of a $2.1-million consultancy package commissioned by the Hongkong Government.

Completed reports cover public education, equipment, radiation monitoring and accident assessment.

These have not been officially released to the public or to Legco, but the one on accident assessment was leaked to the *South China Morning Post* late last week.

● **Information collected by the Government:** A team of three Government officials left for Britain last Friday for further discussions with the UKAEA on aspects of the Harwell consultancy.

The team comprises Mr John Wilson, representing the Economic Services Branch, Dr M.C. Wong, for the Royal Observatory and Mr Graham Osborne from the Electrical and Mechanical Services Department.

Anti-nuclear activists demand that the results of such discussions, together with the information previously collected by the Secretary for Economic Services are released as soon as possible.

● **Contingency plan:** UKAEA experts are now studying what sort of emergency arrangements would be required in case of a nuclear accident at Daya Bay.

Their report, also commissioned by the Government, is scheduled to be completed next year but Miss Maria Tam has urged that it should be produced as quickly as possible.

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DISCUSSION OF, FEARS ABOUT DAYA BAY SAFETY

Safety Analysis for 1988

Hong Kong HONGKONG STANDARD in English 25 Aug 86 pp 1, 12

[Article by Andy Ho]

[Text]

CHINA will not have a complete picture of the safety aspects of the Daya Bay nuclear plant until late 1988 — more than two years after the equipment supply contracts for the installation are signed.

Mr Shi Chunchang, vice-director of the Chinese Nuclear Safety Administration, said the mainland experts will finish their analysis of a French safety assessment on the project by November 1988.

He told a Hongkong anti-nuclear delegation in Beijing last week that a team of over 30 Chinese experts was formed early last year in preparation for analysing a "Prilimary Safety Assessment (PSA)" of the Daya Bay project to be completed by a French contractor.

Framatome, the manufacturer, will carry out the safety study only after the Guangdong Nuclear Power Joint Venture Co has signed to order two of its pressurised nuclear reactors.

But the anti-nuclear activists yesterday said the vice-director has failed to answer why the Chinese have to sign the buying contracts before they know the preliminary safety aspects of the project.

The Hongkong Nuclear Investment Co, a 25 percent partner in the $27-billion investment, said in an earlier statement that the major contracts for the Daya Bay project will be ratified by the Chinese State Council in early October.

Mr Shi said the PSA will cover studies on the "particularly fragile sections" of the nuclear installation so that appropriate safety measures can be incorporated into the system.

The International Atomic Energy Agency will assist the Chinese scientists in the analysis on the Framatome report. The evaluation will be completed in three phases by November 1988.

Mr Shi has assured the delegation that the analysis of the PAS will be conducted under 18 headings and in compliance with the guidelines set by the Nuclear Regulatory Commission of the United States.

Mr Anthony Ha, who returned from the anti-nuclear mission to Beijing last Thursday, said in a press conference yesterday it is unconvincing for China to commit itself to the project before questions on safety are cleared.

Mr Ha called it "worrying" that China has decided to turn to the nuclear option even before the safety regulations are ready.

RResidents' Committee Likely

Hong Kong SOUTH CHINA MORNING POST in English 26 Aug 86 p 1

[Article by Stanley Leung]

[Text]

BEIJING has promised to consider setting up an advisory committee comprising Hongkong and Guangdong residents on the safety of Daya Bay nuclear project.

The message was delivered to a 30-member delegation of local politicians in an apparent move to allay local fear on the controversial project.

Speaking on their return to Hongkong last night after a five-day visit to the Chinese capital, representatives said they had been given the news by the deputy head of China's Atomic Energy Science Academy, Mr Zhang Zhenghua.

The delegation's leader, Mr Ng Shiu-pang, said Mr Zhang promised to consider their suggestion on the establishment of the advisory committee comprising residents in the affected areas such as Hongkong, Shenzhen, and other parts of Guangdong province.

He had also promised that Hongkong people would be given safety information on the plant and that the project would be subjected to international surveillance.

Mr Ng said they were satisfied with Mr Zhang's promise and believed the possibility of setting up the committee was quite high.

The delegation, which was made up mostly of district board members and two Legislative Councillors, Mrs Pauline Ng and Mr Jackie Chan, told the Chinese scientists the committee advising Beijing on safety aspects of the plant should be set up as soon as possible.

If such a committee is to be set up, Mr Ng said, it could be regarded as an official organ to channel Hongkong people's views.

Consequently, there would be no need to resort to signature campaigns.

Mr Zhang emphasised that there was no need to work out an evacuation plan for Hongkong, adding that some 300 Chinese scientists were working on a comprehensive contingency plan for likely accidents to the plant.

Demands for Postponement

Hong Kong SOUTH CHINA MORNING POST in English 3 Sep 86 p 19

[Excerpt]

ANTI-nuclear campaigners, led by radical Mr Fung Chi-wood, called for a six-month postponement of the Daya Bay project yesterday while members of the pro-nuclear faction under Urban Councillor Mr Kwan Lim-ho, declared their confidence in the safety monitoring work on the project.

The Joint Conference for the Shelving of the Daya Bay Nuclear Plant called a press conference yesterday afternoon to voice its demand for the postponement.

Mr Fung said the authorities should try to relieve public anxiety over nuclear energy during the six-month period.

Mr Kwan's group, calling itself Daya Bay – the Scientific Approach Group, reported the findings of a recent visit by members to Beijing with the help of video tapes.

"Members of the National Nuclear Safety Administration in China are well-experienced nuclear experts who have been trained overseas. We therefore have great confidence in their solemn attitude when they check and approve the Daya Bay project," said Mr Kwan.

Mr Fung, in his press meeting, said the call for a moratorium did not mean the group had relinquished its fight to stop the building of the plant.

"We hoped the authorities will do everything they can to relieve the public's anxiety over nuclear energy during the period," he said.

Whether the joint conference would carry on with its fight afterwards would depend on how the public felt about the issue at that time, he said.

"There is no point in us carrying on if we don't have the support of the public," said another leader of the joint conference, veteran unionist Mr Wong Wai-hung.

The joint conference supports the call for a special Legco session to discuss the issue and also wants the Executive Council to review again whether Hongkong should continue to take part in the nuclear project, he said.

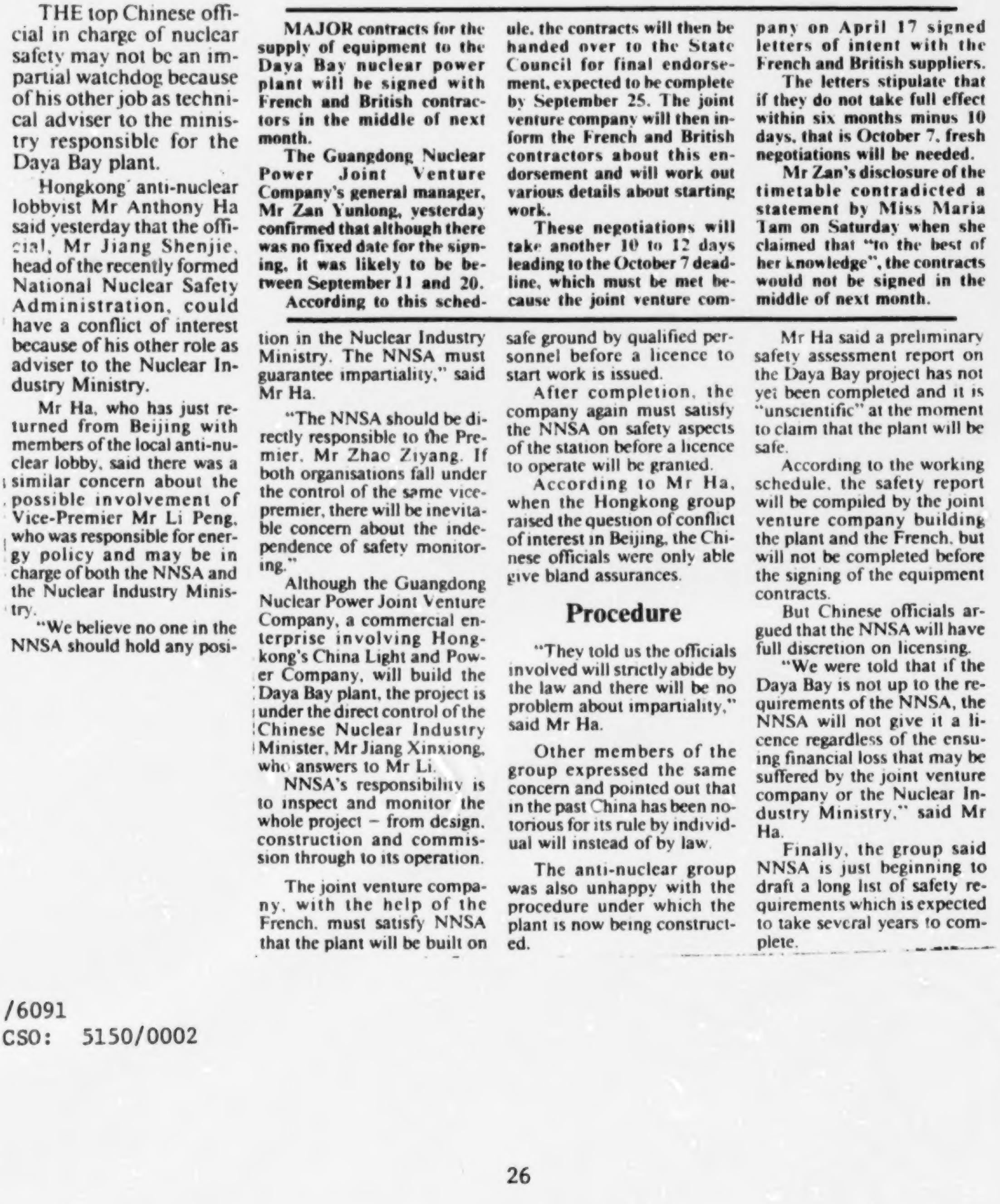
In response to comments that the joint conference opposed the Daya Bay project because it had no faith in China, Mr Fung said: "It's not that we don't have faith in China. We fight because we don't have faith in nuclear energy."

Fears About Safety Chief

Hong Kong SOUTH CHINA MORNING POST in English 25 Aug 86 p 1

[Article by Albert Chan]

[Text]



THE top Chinese official in charge of nuclear safety may not be an impartial watchdog because of his other job as technical adviser to the ministry responsible for the Daya Bay plant.

Hongkong anti-nuclear lobbyist Mr Anthony Ha said yesterday that the official, Mr Jiang Shenjie, head of the recently formed National Nuclear Safety Administration, could have a conflict of interest because of his other role as adviser to the Nuclear Industry Ministry.

Mr Ha, who has just returned from Beijing with members of the local anti-nuclear lobby, said there was a similar concern about the possible involvement of Vice-Premier Mr Li Peng, who was responsible for energy policy and may be in charge of both the NNSA and the Nuclear Industry Ministry.

"We believe no one in the NNSA should hold any position in the Nuclear Industry Ministry. The NNSA must guarantee impartiality," said Mr Ha.

"The NNSA should be directly responsible to the Premier, Mr Zhao Ziyang. If both organisations fall under the control of the same vice-premier, there will be inevitable concern about the independence of safety monitoring."

Although the Guangdong Nuclear Power Joint Venture Company, a commercial enterprise involving Hongkong's China Light and Power Company, will build the Daya Bay plant, the project is under the direct control of the Chinese Nuclear Industry Minister, Mr Jiang Xinxiong, who answers to Mr Li.

NNSA's responsibility is to inspect and monitor the whole project – from design, construction and commission through to its operation.

The joint venture company, with the help of the French, must satisfy NNSA that the plant will be built on safe ground by qualified personnel before a licence to start work is issued.

After completion, the company again must satisfy the NNSA on safety aspects of the station before a licence to operate will be granted.

According to Mr Ha, when the Hongkong group raised the question of conflict of interest in Beijing, the Chinese officials were only able give bland assurances.

Procedure

"They told us the officials involved will strictly abide by the law and there will be no problem about impartiality," said Mr Ha.

Other members of the group expressed the same concern and pointed out that in the past China has been notorious for its rule by individual will instead of by law.

The anti-nuclear group was also unhappy with the procedure under which the plant is now being constructed.

Mr Ha said a preliminary safety assessment report on the Daya Bay project has not yet been completed and it is "unscientific" at the moment to claim that the plant will be safe.

According to the working schedule, the safety report will be compiled by the joint venture company building the plant and the French, but will not be completed before the signing of the equipment contracts.

But Chinese officials argued that the NNSA will have full discretion on licensing.

"We were told that if the Daya Bay is not up to the requirements of the NNSA, the NNSA will not give it a licence regardless of the ensuing financial loss that may be suffered by the joint venture company or the Nuclear Industry Ministry," said Mr Ha.

Finally, the group said NNSA is just beginning to draft a long list of safety requirements which is expected to take several years to complete.

MAJOR contracts for the supply of equipment to the Daya Bay nuclear power plant will be signed with French and British contractors in the middle of next month.

The Guangdong Nuclear Power Joint Venture Company's general manager, Mr Zan Yunlong, yesterday confirmed that although there was no fixed date for the signing, it was likely to be between September 11 and 20.

According to this schedule, the contracts will then be handed over to the State Council for final endorsement, expected to be complete by September 25. The joint venture company will then inform the French and British contractors about this endorsement and will work out various details about starting work.

These negotiations will take another 10 to 12 days leading to the October 7 deadline, which must be met because the joint venture company on April 17 signed letters of intent with the French and British suppliers.

The letters stipulate that if they do not take full effect within six months minus 10 days, that is October 7, fresh negotiations will be needed.

Mr Zan's disclosure of the timetable contradicted a statement by Miss Maria Tam on Saturday when she claimed that "to the best of her knowledge", the contracts would not be signed in the middle of next month.

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TEAM TOLD CONSTRUCTION OF DAYA BAY PLANT TO PROCEED

Hong Kong HONGKONG STANDARD in English 27 Aug 86 p 2

[Article by Albert Chan]

[Text]

CHINA'S Nuclear Industry Minister, Mr Jiang Xianxiong, yesterday stressed again his country's determination to go ahead with the Daya Bay nuclear project despite objections from the public.

Mr Jiang was apparently referring to a Hongkong antinuclear lobby group which had just returned from a fact-finding trip to Beijing and figured in a near confrontation with the Chinese authorities.

Activists

He repeated Beijing's position on the controversial project to a group of Urban Councillors and district board members who were in the Chinese capital on a nuclear fact-finding trip.

The 11 delegates, calling themselves "Daya Bay – the Scientific Approach Group," were led by Urban Councillor Mr Kwan Lim-ho.

They had been labelled in Hongkong as the "counterforce" to the high-profile anti-nuclear activists led by Mr Fung Chi-wood and other pressure groups.

When Mr Fung's group was in Beijing last week, Mr Jiang did not come out to meet them. Instead, they were briefed by several of his middle-ranking staff.

This was regarded by some observers as a slap in the face.

Mr Jiang's statement yesterday was another indication that objections from Hongkong and the one million signatures delivered by Mr Fung were not going to affect the project in any way.

Many consider the project already a fait accompli, although the final contracts have not yet been signed.

"The Chinese Government will treat the matter with a scientific and practical attitude. It will not halt the Daya Bay project because of objections from some people," Mr Jiang was quoted by the China News Service as saying.

Mr Jiang also revealed to the visiting Hongkong group that China's other nuclear plant, which is under construction in Qinshan, near Shanghai, will be expanded from the present plan of one 300 megawatt reactor to four more reactors.

"Work on the Qinshan plant started in 1983 and will be completed in 1989 while the Daya Bay plant will not be completed until 1992. The experience gained in Qinshan will therefore benefit the Daya Bay project," said Mr Jiang.

Risks

The Hongkong delegates also met Mr Shi Guangchang, a senior official of the National Nuclear Safety Administration, who commented on the controversial Harwell Report on accident assessment which was compiled by experts of the United Kingdom Atomic Energy Authority.

This report was commissioned by the Hongkong Government to determine the risks that the Daya Bay plant posed to Hongkong. Its findings had caused concern among top Government officials here.

Mr Shi yesterday said that while China may use such reports as the Harwell as reference, they had no legal status.

"The safety assessment report which is now being prepared is based on international safety regulations with the blessing of the International Atomic Energy Agency. It is therefore the most authoritative," said Mr Shi.

"Reports compiled by other countries do not constitute a legal document."

● The Hongkong Civic Association yesterday called for the joint venture company building the Daya Bay plant to shift the station further away from Hongkong to allay local people's fears.

At yesterday's meeting, association chairman Mr Hilton Cheong-Leen said the group had decided to send a letter to Chinese Prime Minister Mr Zhao Ziyang asking that the plant be relocated.

He added that although changing the location of the project from Da Keng to an area east of Hu Tou Jiao might not be ideal, it was a proposal worth considering.

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FURTHER REPORTAGE ON ASPECTS OF DAYA BAY SAFETY

Accident Survival Plan in 1991

Hong Kong SOUTH CHINA MORNING POST in English 30 Aug 86 p 1

[Article by Albert Chan]

[Text]

HONGKONG will have a nuclear accident survival plan in place by 1991 – about a year before Daya Bay nuclear plant is due to be commissioned.

The Government will then begin conducting regular exercises and drills to test the efficiency of the disaster plan and to ensure that Hongkong is ready to cope with any nuclear mishap by the time the power station opens.

The timetable for the introduction of emergency procedures was disclosed by the Principal Assistant Secretary of the Economic Services Branch, Mr John Wilson, who is the "Daya Bay man" within the Government.

His branch is the overall liaison and policy centre within the Government which is handling the controversial issue.

Mr Wilson was in the branch working closely with the former Economic Services Secretary, Mr Piers Jacobs, back in 1983 and 1984 when the Government and the Executive Council gave the go-ahead for the project.

He recently returned to the section as the nuclear safety issue intensified after the Chernobyl accident.

During a recent trip to Britain, Mr Wilson and two other Government officials met experts of the United Kingdom Atomic Nuclear Authority (UKAEA) to discuss the contingency planning report now being compiled by the authority.

The report, to be ready before the end of this year, will contain only proposals for emergency planning, Mr Wilson said.

Actual safety and emergency arrangements will be mapped out by the Government based on the report's recommendations.

One of these recommendations will be for the Hongkong Government to set up an emergency task force within the administration to cope with any mishap.

UKAEA experts also advised the Government to have regular drills for officials in this task force so that they could be activated immediately an accident occurred.

This suggestion was put to a Hongkong Government delegation during their recent visit to Britain to meet UKAEA experts based in Harwell.

The Hongkong delegation comprised Mr Wilson, Mr Graham Osborne, director of Electrical and Mechanical Services Department, and Dr M.C. Wong, who is in charge of radiation monitoring at the Royal Observatory.

UKAEA officials agreed to a request from delegates to write the report in layman's terms, so that the public could understand.

The Hongkong delegation also spoke to another group of UKAEA experts at Culcheth who are compiling the phase two report of accident assessment on the Daya Bay nuclear station.

The earlier phase one report, which was confidential but leaked to the media, caused considerable controversy, especially the part dealing with the probability of a serious accident.

It highlighted the unlikelihood of an accident – and was released before the Chernobyl disaster.

Mr Wilson said yesterday the issue of accident probability was brought up in the discussion with the experts, who told the Hongkong officials they stood by their study.

But the second phase report, at the request of the Hongkong Government, will include consideration of Chernobyl.

These British experts attended this week's International Atomic Energy Agency meeting in Vienna which diagnosed the Chernobyl case. They will report to the Hongkong Government on the Vienna discussions.

However, due to the expanded scope the British experts have been asked to cover in this assessment report, it may not be completed until two years from now. It was originally expected to be ready next year.

Radiation Warning System

Hong Kong SOUTH CHINA MORNING POST in English 5 Sep 86 p 1

[Article by Sa Ni Harte]

[Text]

RADIATION monitoring equipment, which will give Hongkong warnings of any untoward events at Daya Bay when it starts operation in late 1992, is being tested by the Royal Observatory.

The observatory's $2 million of equipment should be able to take actual measurements before the end of the year and will be used in the Background Radiation Monitoring Program (BRMP).

Senior Scientific Officer of the Royal Observatory's radiation monitoring division, Dr M.C. Wong told the *South China Morning Post* yesterday his department had carried out tests with some of the newly-installed equipment.

He said his department – the co-ordinator of BRMP – started collecting water samples and had asked the Municipal Services Branch to collect food samples such as meat, poultry, milk and rice this month.

Other Government departments will help to collect samples such as soil, ground water, seawater, seabed sediment, and seaweed.

The program will establish a baseline to measure any increase in radiation levels in the environment, Dr Wong said.

This will help to detect any increase in radioactivity from Daya Bay plant when it is ready in late 1992.

He said the first step in monitoring the plant would be to see whether there was any increase in radioactivity in the atmosphere before and after its operation.

The observatory will be working with the Government Laboratory in analysing samples.

The laboratory has set up a radio-chemistry laboratory next to the Royal Observatory's measurement laboratory in King's Park, Kowloon, to support its work.

Dr Wong said: "When we have the instrument installed and tested, we will start doing some sample testing depending on which system we have installed.

"Once we have one system operating, we will start doing the measurement of samples with that system.

"We haven't started measurement yet but we have begun testing methods and procedures in operating the equipment already installed.

"We are aiming at a full implementation of the program by 1989. If the commissioning of the Daya Bay plant is in 1992, it will give us at least two years of complete data."

Recommendations From Harwell

Hong Kong HONGKONG STANDARD in English 30 Aug 86 p 3

[Article by Andy Ho]

[Text]

THE UNITED Kingdom Atomic Energy Authority at Harwell has proposed to the Hongkong Government to set up a body to assess the potential hazards of the Daya Bay nuclear power plant and to map out corresponding emergency measures.

A three-man team, headed by the Director of Electrical and Mechanical Services, Graham Osborne, had detailed talks with Harwell officials in Britain last week.

They also discussed with consultants the necessary contingency plans in case of a nuclear fallout.

Details including manpower requirements for such a set-up, staff training and facilities, and the need for regular exercises were also discussed.

Harwell experts will complete their remaining two studies on the Daya Bay project within two years. They have already finished reports on "Appraisal of Background Radiation Monitoring Programme," "A Public Education Strategy," an "Evaluation of Equipment Specifications" and the controversial "Accident Assessment Phase I."

The consultants' report on contingency planning is expected to be ready before the end of the year. Hongkong officials have provided the consultants additional technical data that Harwell consultants had asked for.

Another report — "Accident Assessment Phase II" — will be completed in 18 to 24 months. An account on possible water and food chain pathways of exposure to radioactive materials will be included in the study.

Mr Osborne has reportedly criticised the Phase I assessment as too generalised and not site specific as well as failing to take account of the Chernobyl disaster.

A Government spokesman said the consultants have confirmed that the Phase I assessment was intended as an initial study on the likelihood of various accidents at the Daya Bay station and their possible radiological consequences for Hongkong.

The Phase I report says "the probability of a severe accident is assessed at one chance in 20,000 reactor year of operation."

The estimation was based on studies related to typical existing European installations similar to the Daya Bay plant. These findings will be refined in the second report, which is expected to be plant and site specific.

During the course of the Phase II assignment, the consultants will visit the territory from time to time to discuss with officials their progress.

In view of the Chernobyl developments, the two parties have also agreed to extend the original scope of the studies.

The consultants are now attending the International Atomic Energy Agency meeting at Vienna on the Chernobyl accident and will report to the Hongkong Government on it.

Any lessons that may be learnt from Chernobyl will be taken into account in the Phase II report on accident assessment.

/6091
CSO: 5150/0003

ATOMIC ENERGY COMMISSION INSPECTOR VIEWS CHERNOBYL LESSON

Safety Measures, Comparison to CS Reactors

Prague TRIBUNA in Czech No 30, 1986 p 17

[Text] "No human activity is without risk and that includes nuclear energy," chief inspector of the Czechoslovak Commission for Atomic Energy, Eng Jiri Beranek, began our discussion. But at the same time he did not forget to point out in his introducton that a nuclear reactor is roughly 10 times safer than all other sources of energy. This fact has not been altered by the accident at Chernobyl, which is constantly talked about by laymen and experts, with inevitable emotion, but also with a thoughtful approach. The results of the investigation into the causes of the accident were also discussed at a special session of the Politburo of the Central Committee of the USSR Communist Party.

[Question] Is it possible to say today what was the sequence of events in Chernobyl on April 26?

[Answer] A detailed analysis is not yet complete. It is still not known what was the initial cause, the first break-down which led to the chain of events of the accident. Nevertheless, we now have an overall picture of what happened at Chernobyl.

In the morning, the Number 4 unit of the power plant was in a planned shutdown. The output fluctuated between 6 and 7 percent, that is about 200 megawatts, apparently in order to prevent a so-called xennon poisoning, which would inevitably occur and would prevent quick reactivation of the reactor to full output. That happened at 1:23:40. During a10-second period the output of the reactor suddenly rose to half of its nominal value. Cooling water began to evaporate quickly and steam was produced. When it reacted with zirconium, one of the main construction materials of this reactor type, a considerable amount of hydrogen was produced. Hydrogen, as is well known, combines with air to make an explosive mixture. That is what caused the explosion or, more likely, several explosions which did considerable damage to the reactor and its core, the building and its equipment. Practically all the technical safety and localizing systems were immobilized, and as a consequence radioactive particles escaped from the power plant. At the moment of the accident the chain reaction was automatically interrupted.

As a consequence of the explosion a fire occurred in the engine room, which is located in this type above the reactor and contains the charging engine and part of the primary circuit. The intense fire--according to some reports flames shot up to 30 meters into the air--completed the process of destruction and put out of action part of the equipment which was not immediately affected by the explosion. Thanks to the great heroism of the firemen, the fire, which could have spread also to the adjacent Number 3 unit, was put out in 90 minutes. That is why most victims of the accident are self-sacrificing firemen. Once the fire was put out, the first, shorter stage of the Chernobyl disaster ended. Essentially all the important systems were destroyed, and radioactive material escaped, attaining a height of approximately one kilometer.

[Question] What happened next?

[Answer] In the meantime, the next phase of the accident occurred in the heavily damaged core. The shutdown of both the regular and emergency cooling circuits had the most serious consequences. Fuel rods in the exposed core gradually overheated and melted. This process was greatly exacerbated by the presence of 1700 tons of graphite in the reactor. At the operational stage the graphite reaches a temperature of 700 degrees and prevents quick cooling of the total system. It is actually immaterial whether it catches fire or not.

During those moments the most imperative task was to reduce the escape of radioactive material to a minimum and ensure the cooling of the reactor core, which was still releasing heat due to radioactive decay. Therefore, helicopters dumped more than 4,000 tons of sand, soil, boron, dolomite, limestone and lead to make a protective cover. In that way the release of radioactive material was quickly reduced and practically ended by May 13. At the same time, emergency procedures were introduced for intense cooling of the reactor floor with liquid nitrogen. A meltdown of the core by residual heat was prevented. At the same time the nitrogen created an inert atmosphere which prevents other chemical reactions from occurring.

[Question] What is being done in the power plant now?

[Answer] When the main tasks of this phase were taken care of--preventing the release of radioactive material and reducing the temperature--attention was focused on deactivating the nuclear power plant equipment and constructing a concrete containment structure for sealing the reactor. That work is still in progress.

[Question] Can you describe the type of reactor which is in use at Chernobyl?

[Answer] It is a boiling reactor of high capacity with uranium-graphite cooling by standard water. It has a long tradition in the Soviet Union. This type (RBMK) was used in the first Soviet nuclear power plant, which was also the first one in the world, in Obninsko as early as 1954. The same construction principles were retained for the experimental industrial units of the Belorajska nuclear power plant. Its long-term successful operation made it possible to construct reactors of great capacity serially. Prior to the Chernobyl accident 18 of the standard type were in operation--both the 1,000 and the 1,500 megawatt units. The plans for a new generation--with an output of 2,400 megawatts--are being completed.

[Question] What are the systems of operation and safety in this type of reactor?

[Answer] First of all, it is necessary to know that it is made up of 180 independent circuits. The special feature is that the reactor does not have a pressure vessel. The graphite gridwork is enclosed in a thin-walled hermetic container and fuel rods are placed in ducts made of zirconium alloy.

In principle this concept is highly reliable. Disturbing the integrity of the individual control ducts does not essentially pose any great danger. Changing them is a normal operational procedure. The equipment is provided with an emergency cooling system for the core, which is reliable even in the event of the maximum projected accident, an instantaneous transverse rupture of the delivery collector of the main circulating pump. The release of steam and radioactive particles if conduits and active ducts are damaged is prevented by boxes that are resistant to excess pressure of 4.5 kg per square centimeter. These function as safety covers (containment structures) in water pressure reactors. Any release during a projected accident is localized in these boxes and the steam condenses in a special basin barboter (as published) which is connected to the above mentioned system. Safe operation is guaranteed by other measures as well. That is why similar types of reactors are used in other countries, including the USA.

[Question] Is the RBMK 1000 reactor different from other types that are in use? Can they have a similar accident?

[Answer] Compared with the most widely used water pressure reactor moderated and cooled by standard water (TYPE VVER), which is the foundation of our nuclear energy, the main difference is the physical characteristics. As a result, there is a fundamentally different layout of the core and primary circuit. The VVER type, moderated by standard water, is enclosed in a compact pressure chamber with a strong concept of central control and regulation. The RBMK type, which is moderated by graphite, is much larger in area and has pressure channels instead of a pressure chamber. The fundamental differences are the presence of flammable graphite, complicated construction and a complicated system of controls and regulations.

[Question] What are the implications of this?

[Answer] The differences are so significant that the same or a similar accident in a water pressure reactor is impossible!

This fact was confirmed by one of the groups of experts of the International Commission for Atomic Energy. They stated that it does not appear that a new physical phenomenon has been identified which would require an immediate modification of other types of nuclear power plants. Factors which determined the causes and progress of the accident are typical for the RBMK type reactor.

[Question] Is it possible to compare the Soviet and Western concepts of nuclear safety of this type of reactor?

[Answer] Your best answer is the articles in the more serious segment of the Western press. For example, one of the largest US newspapers, the INTERNATIONAL HERALD TRIBUNE, wrote on May 20 among other things: "The Number 4 unit at Chernobyl was enclosed by a large containment structure made of heavy steel and concrete. To supplement it there was a water vessel under the reactor designed to suppress pressure by condensation of the steam, the area around the core was filled with nitrogen, which in contrast to oxygen does not promote fire, there were doubled and well-protected cables, modern control equipment of the same type as in Western countries, and a system of armatures and passages for closing off individual areas. All that is similar to safety equipment used in the USA and anywhere in the West."

The British GUARDIAN of the same date states that the safety system of the Number 4 unit at Chernobyl was designed for greater over-pressure than containment structures of many nuclear power plants in the USA and elsewhere.

[Question] The technical standards of the safety measures at the Chernobyl nuclear power plant were on a world level. How was it possible that an accident occurred?

[Answer] What determined the course and extent of the accident was the fact that the main safety systems--emergency cooling and a localizing barrier--were destroyed before they could be deployed. Had there been no chemical explosion and fire, it would have been obviously possible to stop the initial malfunction without consequences for the service personnel. The main contributing factor to the accident was, as has always been the case up till now, the human factor. Man failed first of all. It was determined that the accident happened because in a number of instances workers at the power plant grossly violated regulations governing the operation of the reactors, as was stated at the special session of the politburo of the Central Committee of the USSR Communist Party.

This case, however, suggests a comparison with the classic source of explosions and fires--a military conflict in which conventional weapons are used. A single rocket could cause a similar accident at any nuclear installation anywhere in the world. It is essential, therefore, to resolve in the forum of the United Nations and at the Geneva Disarmament Committee the question of prohibiting military attacks on nuclear installations, something the socialist countries have urged for a long time.

[Question] So far, we have discussed the technical aspects of the accident. Can you describe the situation regarding radiation?

[Answer] During the release of radioactive matter from the reactor an unforeseen event occurred on which the standard computers for calculating the spread of radioactivity did not count. As a result of the flow of heat, some released radioactive particles immediately rose to a height of 1 to 2 kilometers. The continental flow of atmospheric strata dispersed them equally over the European continent so that nowhere--with the exception of the immediate area around the reactor--did radiation exceed the level of doses considered safe for the public.

[Question] What level are we talking about?

[Answer] Assuming that 1 to 3 percent of the fuel rods melted down, the fission material produced, for example, only about 7-21 grams of radioactive iodine 131. After it was dispersed over the European continent, the total fall-out of iodine 131 in individual countries was measurable in milligrams.

[Question] The monitors, however, did not become quiet....

[Answer] You are right. It points out their extreme sensitivity. They record practically every single breaking atom!

Thank you for the discussion.

Accident Causes and Consequences Assessed

Prague TRIBUNA in Czech No 31, 1986 pp 1, 17

[Text] After the Chernobyl accident we wrote about the problem of nuclear safety in TRIBUNA on several occasions. Today the purpose of our discussion with the chief inspector of the Czechoslovak Commission for Atomic Energy, Eng Jiri Bernanek, is to draw a lesson from the information we have so far. At the same time we want to show what direction the work of scientists, design engineers, planners, builders and operators, and the state supervisory personnel will take to improve the nuclear safety and operational reliability of nuclear power plants. We have to touch inevitably also upon some international aspects of nuclear safety.

It is necessary to focus on this because last year almost 400 reactors in 26 countries produced 15 percent of all electric power. Nuclear energy literally has an impact on the entire world. That, of course, is what makes it essential to reduce the possibility of risking a repetition of a similar unfortunate occurrence.

[Question] The causes of the Chernobyl disaster were discussed recently at a special session of the Politburo of the Central Committee of the CPSU. What are the lessons to be drawn from it?

[Answer] It is evident from the state commission's report on the results of the investigation into the causes of the accident at the Chernobyl nuclear power plant that no new physical phenomenon was detected which would have influenced the course of the fission chain reaction in the reactors or the operation of the nuclear power plant. The investigation found the cause to have been primarily inadequate implementation of operational procedures.

Violations of operational regulations and neglect of shortcomings culminated in human failure which was not confined to the power plant itself. It is a precondition for safe operation; to create an atmosphere conducive to compliance to regulations; it is the responsibility of a number of workers, many of whom were at central agencies far from Chernobyl.

The lessons are therefore explicit. The main points were summed up by comrade Michael Gorbachev already in mid-May of this year in his televised address, and the Politburo of the Central Committee addressed them during the discussions of the state commission's report. This concerns primarily the specific Soviet proposals to create an international system for developing nuclear power based on close cooperation among all countries. It is no exaggeration to say that this would be greeted by the entire world. Together we must not allow a similar disaster to happen again anywhere in the world.

[Question] What is the status of the Soviet proposals at this time?

[Answer] Groups of experts of the International Atomic Energy Agency (IAEA) in Vienna are now discussing the proposed agreements providing for timely information on nuclear accidents and mutual assistance in such cases. Both will be submitted for approval to the special session of the general conference of IAEA, which will meet in September.

[Question] What are the principles and the basis for the preparation of both these documents?

[Answer] The preliminary discussions make use, among other things, of our agreement with the Austrian republic concerning the disposition of questions of mutual interest related to building and operating nuclear power plants, which has been in force for over 2 years. It is, so far, the only example of a specific solution of a complicated problem between countries with differing political systems and attitudes toward nuclear energy.

[Question] What is the essence of this agreement?

[Answer] Once every 2 years we exchange our views on the development of nuclear programs in individual countries. The fact that nuclear energy is prohibited in Austria by law does not make any difference. Six months before putting on line any reactor located close to common borders, experts from both countries evaluate its readiness. For example, we held such consultations about all units in Dukovany. The agreement also contains a provision for establishing a special network of mutual understanding. In case of an unforeseen event, the other side will be given necessary information. That was why immediately after the Chernobyl disaster Austrian television, for example, broadcast a talk with one of the members of the joint group of experts, who explained in detail the safety features of our reactors.

The experience we have had in applying this agreement confirm that it is increasingly important to take similar steps in the international level. They are just as important as the necessary modifications or modernization and improvements of the monitoring system of radiation levels. But the main attention has to be focused--and comrade Gorbachev emphasized this in his letter to the director general of IAEA--on measures which will remove any possibility of other nuclear accidents.

[Question] What measures are we talking about? What will be their thrust?

[Answer] The revolutionary idea is that scientists of various countries should cooperate in developing a new generation of reactors, as was stated in the resolution of the Politburo adopted during discussions of the state commission's report. The long-range goal is to construct a reactor in which a meltdown of fuel rods would be absolutely impossible. Basically, it is essential to prevent any situation arising in a nuclear power plant which would cause fuel rods to melt down and release large amounts of radioactive material. We also think it is very important to increase the effectiveness of the technical systems designed to prevent their release in the event that a meltdown of fuel rods has already occurred.

[Question] What are the principles on which IAEA based these goals for safe nuclear power?

[Answer] They are derived from global statistics of nuclear accidents. They demonstrate that similar events when a meltdown of fuel rods occurs--although they seldom occur--are among the most serious.

For example, in the case of the largest accident at the nuclear reactor at Three Mile Island in the USA, 50-70 percent of the fuel rods were affected (in Chernobyl only 1-3 percent). The expenses for decontaminating the power plant and the immediate neighborhood alone came to 1 billion dollars. More often, however, malfunctions of safety (localizing) systems occur. In cases when both of these problems are present in the same accident, which is very unlikely although it did happen at Chernobyl, the area around the power plant can be seriously affected.

[Question] Was this not the result of the fire?

[Answer] The detrimental effect of a fire on reactor safety has been noted many times. A classic example occurred at the Browns Ferry power plant in the USA where a lit candle started a fire! As a result, the reactor was taken out of operation for a whole year and damage amounted to $10 million. Warnings about fires have obviously been greatly underestimated in the past, so that the Chernobyl experience teaches us a specific lesson: any likelihood of a fire in a nuclear power plant has to be removed at all costs! Even more pressing is the need to eliminate any condition which would lead to the creation of an explosive mixture that could cause an explosion.

[Question] Why did the output in the Chernobyl reactor increase in a mere 10 seconds to half of its maximum?

[Answer] That is not yet clear. But even in this respect such individual malfunctions, which do not develop into accidents are not isolated cases. For example, in the American reactor Salem the automatic shut-down relay did not function although the operational procedure required it, and it showed up on the control panel as having shut down. In reality, however, the reactor was not shut down. The technician recognized the problem in time and compensated by manual operation.

A brief look at the world statistics of nuclear accidents shows the importance of detailed information about the smallest, seemingly inconsequential, problems. Discussing them in IAEA is useful for all operators of nuclear power plants. Only a collective effort can fundamentally contribute to accelerating and increasing further improvements of the nuclear safety level.

[Question] Let's take a look at our energy situation. How does the Czechoslovak Commission for Atomic Energy, as the governmental supervisory agency, rate the nuclear safety level in Czechoslovakia?

[Answer] Our results are commensurate with the worldwide experiences of the performance of almost 400 reactors with more than 4,000 operational years behind them. The operation of the 6 reactor units of the type VVER 440 in Jaslovske Bohunice and Dukovany can be characterized as stable, reliable and safe. During the 23 years they have been in operation a situation never occurred which would or could lead to a release of radioactive material and to endangering the workers at the power plant or the environment. This system also proved to be very stable, with a considerable reserve in the most important parameters--heat removal and fuel rods.

[Question] These good results notwithstanding, strict governmental supervision of nuclear safety is in place. What does it involve?

[Answer] Our commission maintains permanent inspectors in all our power plants. Each day they check that technical and organizational measures that ensure safe operation are being followed. Moreover, inspectors of state supervisory agency make unannounced inspections. Last year there were 60 inspections, this year 38 to date. Since the beginning of last year, the state supervisory agency issued almost 200 rulings, assigning tasks with binding deadlines for resolving problems that were observed. There is no appeal against this in the law related to state supervision of nuclear safety, even if the order is to reduce output or stop operation of nuclear equipment.

[Question] We can therefore state that nuclear safety of our installations is of a high order. Nevertheless, what determinations have been made following the Chernobyl disaster?

[Answer] They are divided into short-term and long-term. Their common feature is that the prerequisite of high nuclear safety is the prescribed quality of equipment and systems, the qualification of workers who service them, and the conduct of the operation itself. We had that in mind when we immediately intensified our inspections.

On the basis of what we have learned, certain measures have already been taken. This includes, for example, strict observance of a work period not to exceed

8 hours for selected categories of operational specialists, supplementary equipment, and standardized lay-out of certain auxiliary junctions. An overall evaluation again showed that our nuclear power plants function at a high level of safety.

[Question] And the long-term measures?

[Answer] Analysis of the causes and consequences of the Chernobyl accident continues. A set of long-term measures is really just being formulated. Apart from new technical solutions, the need for which we discussed, it is already apparent that it will be necessary to review the comprehensiveness and effectiveness of all safety measures, including plans for protecting the public at both the state and international level. The development of the radiation situation and how to control it will also be the subject of long-term studies and deliberations.

[Question] The report of the Soviet state commission on the results of the investigation into the causes of the Chernobyl accident emphasized the importance of the human factor for nuclear safety. Is this fact also taken into consideration in our nuclear power plants?

[Answer] Man and his actions, behavior and decisions play an indispensable role even in a highly automated nuclear energy industry. The entire system of training selected operators of nuclear equipment and the demand for considerable expertise and comprehensiveness are based on this fact. Training takes place at the Trnava Branch Training and Educational Center of the Research Institute of Nuclear Power Plants Jaslovske Bohunice. Its equipment meets all the needs and requirements for specific expert competency expected of operational specialists. Their practical training is based on training simulator which can duplicate normal operations and a large spectrum of transient situations in the VVER 440 unit. The high requirements of the training, preparation at an institution of higher education, include the length of the course--it takes 2 years on average.

[Question] For how long is it valid?

[Answer] It is valid for only 2 years, and it is lost even in a case when a technician is, for example, transferred to another place of work for more than 6 months. Due to systematic training, which the state examination commission supervises, we now have more than 250 well-prepared, experienced technicians for nuclear equipment. It is also evident that they are well qualified from the relatively low number of problems due to human failure.

[Question] Would you like to say something in conclusion?

[Answer] In the concept of ensuring nuclear safety there are no differences among individual countries. All systems rely on preventing problems by constantly improving the reliability and quality of equipment and the operation itself and in measures ensuring the least possible consequences. That is the basis of the necessary safety level of nuclear energy. Basically, it is superior to that in other branches of industry. At the same time, however, it is necessary to emphasize that nuclear safety in the world is unthinkable without stopping material preparations for nuclear war. Logically, it presupposes total liquidation of the means of waging war.

Thank you for the discussion.

12605/12947
CSO: 5100/3052

GROUP OF SIX MONITORING U.S. NUCLEAR ARMS TESTS, SAYS YRIART

Buenos Aires AMBITO FINANCIERO in Spanish 21 Aug 86 pp 36, 24

[Article by Martin F. Yriart: "Argentina Monitoring U.S. Nuclear Weapons Tests"]

[Text] In order to help end the nuclear arms race, Argentina and four other members of the so-called "Group of Six" have begun to monitor American nuclear tests with their seismographic network. Although no official announcement has been forthcoming so far, the program is already at an advanced stage. Now that the initial steps have been taken, that is to say, the recording of important seismographic data relative to nuclear explosions, study has begun on ways of integrating the national networks of the countries involved through a communications satellite and of expanding the number of participants. In addition to Argentina, Greece, Sweden, Mexico and India are currently involved in the effort. Tanzania, the sixth member of the group, does not for the time being have suitable facilities for this purpose. "The Six" have already communicated their decision to the nuclear powers and have extended an invitation to hold a meeting of experts from both sides to discuss the initiative and other proposals by the group to further disarmament.

Exhortations

Although the unarmed nations (and the "Group of Six" itself) have in the past urged the nuclear powers to dismantle their nuclear arsenals and have offered to mediate in securing reciprocal superpower assurances, this is the first time that a group of nations without nuclear weapons is taking specific steps that materially alter the strategic world balance by introducing a new factor.

Until now, nuclear tests were monitored only by the superpowers. Henceforth, however, there will be reliable information on their tests whose disclosure to the rest of the world will not depend on their good will. When the major powers tested their weapons in the atmosphere, the results could be determined directly by measuring the increase in radioactive fallout. This possibility vanished, however, when they decided to conduct nuclear tests underground.

Explosions

Nevertheless, the earth's seismic properties enable underground explosions to be detected at huge distances. Tests greater than a kiloton (one-twentieth as large as the Hiroshima bomb) in the Nevada desert can be detected from the observatory at San Juan University's National Institute for Earthquake Preparedness. Smaller tests could go unnoticed amid the seismic "background noise" that constantly bombards the earth. And other geological phenomena could make detection difficult from a remote spot. But a coordinated, satellite-linked network could obtain much more reliable results.

"The Six" decided in Mexico to build such a network, drafting a document dated 7 August 1986.

In addition to the decision that the group made independently, the document contains a series of proposals for on-site monitoring that will require the participation of the United States and the USSR. They call for the installation of measuring equipment at test sites (Nevada in the United States; Semipalatinsk and Nova Zemlya in the USSR) and elsewhere in the two countries, as well as the "internationalization" of 40 to 60 seismological stations already in place there. After a provisional stage that would test the system's effectiveness, definitive accords could be hammered out.

Such a system would resolve the United States' longstanding objection that an agreement to suspend nuclear testing as a preliminary step towards disarmament would be "unverifiable" by the parties. If a group of independent nations guaranteed compliance with the pact through its monitoring, the problem of "verifiability" would be eliminated.

When this solution began to take shape, however, the United States raised another argument against an end to nuclear testing: the tests are now necessary to develop the technology required for the Reagan administration's Strategic Defense Initiative (SDI), which according to its proponents would by itself do away with the threat of nuclear war.

The developing countries and the nonaligned nations have pointed out the preposterous cost of "arming oneself not to fight" and the benefits that would accrue to the world's economy if the huge amount of money currently earmarked for nuclear weaponry were used for peaceful purposes.

Although official discussions are still not under way, "the Six" are actively making contact with other nations that are interested in spurring this initiative to expand the seismological monitoring network and further this alternative to world disarmament. Experts from "the Six" are working hard to perfect the technical and informational mechanisms that are needed for the system to yield the desired results.

8743
CSO: 5100/2128

ARGENTINA

BRIEFS

CNEA MOVES TOWARD PRIVATIZATION--By virtue of Decree No 1008 the Executive Branch has authorized the establishment of a corporation in which private capital has a majority interest, to run the Special Alloys Factory of the Ezeiza Atomic Center. The purpose of the corporation, which represents the first step towards privatization within the National Commission for Atomic Energy, will be to produce and market zirconium-alloy casings and semifinished items for the manufacture of nuclear-fuel elements and related activities at any stage of their processing, as well as to produce and market ferrous and nonferrous metals. The decree, which has already appeared in the Official Gazette, states that the corporation "will consist of a majority of domestic private capital" and that "the capital, the management capabilities and the industrial operating experience that the private sector will supply will seek to give the Special Alloys Factory a level of productivity and efficiency that meets the requirements of the program to furnish piping and semifinished items for the manufacture of nuclear fuel." [Text] [Buenos Aires TIEMPO ARGENTINO in Spanish 16 Aug 86 p 11] 8743

CSO: 5100/2128

FOREIGN EXPERTS VOUCH FOR SAFETY OF ANGRA I

Sao Paulo ISTOE in Portuguese 20 Aug 86 pp 65-66

[Text] Some ten distinguished national and foreign experts and scientists achieved the feat of restoring a little of the prestige lost by the Brazilian nuclear program. A conference on reactor safety sponsored by the Brazilian Academy of Sciences held in Rio de Janeiro last week gave a practically unanimous endorsement to the operation of the Angra I plant and an incentive to the construction of Angra II and III. "Angra I is in very good operational condition," declared the most illustrious visitor, the Italian Enzo Iansiti, secretary for nuclear safety affairs of the International Atomic Energy Agency, whose experts visited and approved the plant's facilities last September.

It was a relief for industrialist Licinio Marcelo Seabra, 46 years old, president of NUCLEBRAS--the controversial state enterprise charged with managing the Brazilian nuclear program--irked in recent weeks by a succession of protests and political faux pas. Ten days earlier, the judge of the Angra dos Reis judicial district had issued an injunction holding up operation of the Angra I reactor because of a lack of safety measures in case of an accident. At that time, NUCLEBRAS was already at odds with the scientific community because it had ordered the publication of an announcement indicating that that community unreservedly defended the nuclear program. The broth thickened on the 6th when, over and above the whole controversy, President Jose Sarney decided to build Angra II and III, the partial cost of which as envisaged in the Goals Plan is $1.4 billion by 1989. Another $1 billion will be necessary if Brazil confirms its intention to build a uranium enrichment plant to supply fuel to the reactors. Those figures will obviously double considering the interest on the loans assumed to implement the projects. For example, Angra I cost $.24 billion and consumed more than $3 billion in interest and charges.

Little safety and much money ended up stigmatizing the nuclear program, which did not at all worry the specialists gathered by the academy. "It is only a matter of time before the Brazilians learn to like the atom," said the Frenchman Pierre Tanguy, inspector general for safety affairs of the Electricity Company of France. It cannot be said that such an optimistic conference was set up as one more lobby of the government-connected nuclear sector. Nevertheless, that did not keep it from being used. "It is with pleasure that I see the participation of eminent researchers at this meeting," said nuclear physicist and engineer Rex Nazare Alves, chairman of the National Nuclear Energy Commission, representative of Brazil in the IAEA board, and the official in charge of safety in Angra dos Reis. "It came at a good time, when we are still experiencing the impact of the Chernobyl accident in the Soviet Union, and it is imperative that our safety actions enjoy the trust of the Brazilian nation," remarked Alves.

It is quite true that the Italian Enzo Iansiti advised Brazil to refine its safety requirements--without specifying them because the recommendations of the international agency are generally confidential. But this lack of refinement would not prevent the immediate start-up of operations by Angra I because the safety of nuclear reactors is an extremely complex exercise. In addition to the strict quality control of thousands of components to avoid accidents, it is necessary to have a rapid emergency system that, in the case of a failure, will interrupt the atomic reaction and prevent the escape of radioactive material into the environment. Also crucial is the plan for evacuation of the inhabitants in the neighborhood of the plant in the event that all other procedures fail. Brazilian experts guarantee that the Angra plants project admits of a minimum possibility of error--something like one accident in 2,500 years, with all three plants in operation.

"It is useless to try to prove that nuclear energy is not dangerous when we all know that it is," spoke up one of the few dissenting voices at the conference, that of Professor Jose Goldemberg, rector of the University of Sao Paulo, a moderate critic of the Brazilian nuclear program. "What remains to be seen is if it is necessary to live with those risks," he said, explaining that the Brazilian energy situation may be serious but it is not desperate, as the supporters of expansion of the nculear program allege. According to goldemberg, the prevailing idea of spending $4 billion in the energy sector, with emphasis on atomic energy, "was a victory for the nuclear lobby inconsistent with the real situation." In his opinion, it would be sufficient to apply conservation in the sector and operate only with the Angra I and II plants. Former Minister of Industry and Commerce Joao Camilo Penna, the current president of the Furnas Electric Power Stations, the operator of Angra, did not agree that the forecast of an 8.5 percent increase in energy consumption was excessive. "The estimate was made by conscientious people," he pointed out. "Historically, the evolution of energy consumption is calculated at 1.5 percent above the growth of the Gross National Product, and the current forecast for the growth of the GNP is 7 percent."

As for the victory mentioned by Goldemberg, that was Sarney's decision to order the construction of Angra III. But it was a limited victory. The nuclear program in fact has undergone a reduction, starting with the halting of the original plans for the uranium enrichment process. The fate of NUCLEBRAS itself, thus, remains open. Established to build and operate eight plants, according to the agreement signed with Germany in 1975, the state enterprise will have much more modest functions. There will be only three plants, and the last two will not begin to operate until 1995, not 1989 as had been scheduled. It is also not clear what will be done with the five subsidiaries, the function of which was to take care of the infrastructural requirements essential to the original ambitious project: from civil engineering works and heavy electrical material to the complete uranium enrichment cycle. A presidential committee created to study the program suggested various solutions, from privatization to pure and simple abolition. "Everything now will depend on the financial equation for the energy sector," said Licinio Seabra, the president of the state enterprise. "The important thing is that the funds should guarantee continuity of the development of atomic energy." And he dreams on: "That is basic and it is not enough merely to engage in study. It is necessary to create a market for that merchandise in Brazil."

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CSO: 5100/2120

NUCLEAR POWER ROLE IN FUTURE, VAALPUTS WASTE REPOSITORY

Johannesburg BUSINESS DAY in English 9 Sep 86 p 3

[Text]

NUCLEAR power will play a more significant role than coal in SA's longer-term electricity requirements, Mineral and Energy Affairs Minister Danie Steyn disclosed yesterday.

Steyn was addressing an international conference at a Cape Town hotel on treatment, packaging and dumping of radio-active waste in arid environments.

SA was currently largely committed to coal as the country's source of energy because of the large reserves and the Republic's reduced dependence on oil through the establishment of oil-from-coal technology.

However, the country's energy policy "recognises the fact that the future electricity requirements of the country will need to be met by a combination of coal-fired and nuclear power stations, with nuclear energy playing a more significant role in the longer term," he said.

Steyn also said the nuclear waste repository at Vaalputs, in the northern Cape, was scheduled to receive its first shipment of waste from the Koeberg nuclear power station near Cape Town in November.

"The quality and extent of research has led to its (Vaalputs') establishment being compared well with the best in the world.

"Indeed SA is one of the few countries, if not the only country, that identified a disposal site prior to the commissioning of its first nuclear power station," he said.

Steyn said attention was currently being paid to the question of storage of spent fuel at Vaalputs.

And an "expert group" had been established to study the question of the disposal of high level waste in SA.

"Although spent fuel from Koeberg may not be reprocessed in SA, we must face the possibility of waste arising from reprocessing fuel from Koeberg being returned to us from the overseas reprocessor for disposal," he said.

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CSO: 5100/1

ASCO REACTOR SHUTDOWNS PROMPT INVESTIGATION

Officials Concerned by Recent Shutdowns

Madrid DIARIO 16 in Spanish 25 Aug 86 p 12

[Article by Elias Pujol]

[Text] Tarragona. The continuing problems afflicting the Asco nuclear complex are of concern to both the towns near Asco and to the Nuclear Safety Council, which has begun an investigation to determine the causes of these repeated anomalies.

Last weekend within a period of less than 20 hours, the second unit of the Asco nuclear power plant suffered two breakdowns. In both incidents, rods were released, immediately shutting down the reactor.

The first of these incidents occurred shortly after 1100 on Friday [22 August]; by 2000 that evening the situation had still not returned to normal. Then at 0600 on Saturday morning, another technical problem caused the shutdown of unit number two; this was less than 20 hours after the first failure. In both cases the reactor was stopped immediately in order to avoid overheating.

These failures were triggered by problems with the valves of the steam generators which prevented proper cooling of the reactor.

According to sources from the plant, there were never any radioactive leaks causing any type of danger. The same sources reported that unit two of the plant will remain shut down until early this week. The anomaly was immediately reported to the Nuclear Safety Council, to the General Division of Energy, and to civil government officials in Tarragona.

Since July there have been four emergency shutdowns at the Asco power plant, though at no time was there any danger of contamination caused by a radioactive leak. These failures took place on 1 and 23 July and 22 and 23 August.

Moreover, Asco I has been shut down since early in the summer for uranium refueling. This period has been used for an extremely careful checkout of all the circuits. Asco I is not scheduled to begin operating again until early September.

The repeated breakdowns and incidents which have been afflicting the Asco nuclear complex have been arousing anger in the towns located near the nuclear complex, and concern within the administration.

The Nuclear Safety Council, the organization which supervises the operation of all of Spain's nuclear power plants, has announced the start of an investigation to determine whether the failures are due to untimely failures in the components or, on the contrary, whether they may be caused by defects in the plant's organizational system.

The mayors of the towns of Flix and La Fatarella have expressed their concern about the repeated failures that have plagued the Asco complex since the plant first began operating.

Nuclear Safety Council Closes Reactor

Madrid DIARIO 16 in Spanish 26 Aug 86 p 15

[Text] Madrid. The Nuclear Safety Council yesterday ordered the shutdown of the Asco nuclear power plant until the causes of the failure of the safety valves and of the other anomalies which have led to repeated failures in unit two of the nuclear complex have been clarified.

To these technical failures a new anomaly must now be added; this was found yesterday in unit two during a routine review of its safety systems.

The new anomaly was a defect in the steam isolation valve in the reactor's secondary cooling system, according to sources from the plant's management.

Both Asco units are shut down now: unit one for fuel reloading, and unit two because of the two "emergency shutdowns" which took place last weekend.

The first incident happened on Friday, while the water isolation valve in one of the steam generators of the reactor's cooling system was being closed. The Saturday incident, according to the director of the Asco nuclear power plant, Ignacio Camps, was caused by the passage of air into the transformation gases, which led to the plant's shutdown. "When we tried to close the three steam isolation valves, one did not work."

Ignacio Camps added that liability compensation will be sought from the company which manufactured the valve, "whose technicians are now checking it."

The Nuclear Safety Council has also sent two inspectors who, accompanied by the Council's permanent representative at Asco, will investigate the causes of these anomalies.

Enrique Peira, deputy director of FECSA [Electric Power of Catalonia, Inc], the principal owner of the Asco power plant, stated that "the shutdowns at the plant were protective steps, not emergency situations."

The ministry of industry and energy, in a statement released yesterday, reported that the problems which occurred last weekend did not create any risk for the nearby population.

A History Replete with Accidents

Tarragona. So far in 1986, there have been 11 shutdowns of unit two (six of them in the summer). This unit began to operate on 23 October 1985.

The most recent were:

1 July 1986: Shutdown of the reactor as a result of the unscheduled closing of a water supply isolation valve.

Later, prior to the startup of the unit, while trying to close the three steam isolation valves of the principal circuit, two of them failed.

23 July 1986: Shutdown of the reactor as a result of the unscheduled closing of two water supply isolation valves.

22 August 1986: Shutdown of the reactor because of the unscheduled closing of a water supply isolation valve.

23 August 1986: Shutdown of the reactor because of the activation of the protective system of the main transformer. Later, before the startup, while trying to close the three main steam isolation valves, one of them failed while still open.

Investigation, Shutdown Concern Mayor

Madrid DIARIO 16 in Spanish 27 Aug 86 p 15

[Article by Elias Pujol]

[Text] Tarragona. The two technical experts sent by the Nuclear Safety Council to the Asco power plant yesterday began a careful investigation to determine the causes of the failures which have been occurring on a regular basis in Asco's unit two, and which have made this plant the most troublesome of all the nuclear plants operating in Spain.

In addition, yesterday a specialist from the U.S. firm, Monroe, came to Asco. This company takes care of operating mechanisms of the nuclear reactor's steam isolation valves.

The investigation of the causes which have led to repeated failures at Asco's unit two has been going on all week, reported the Nuclear Safety Council.

Urgent Meeting

The mayor of Flix, Pere Munoz, yesterday sent a telegram to the civil governor of Tarragona, Vicente Valero, urging him to call an urgent meeting of the district's civil protection council, which has not met for a year, in order to discuss everything that should be done after the failures which have been occurring in the Asco nuclear complex, and all the information and statements which have appeared in the media on Asco II, "and also to learn the contents of the telegram which the civil governor sent to the Nuclear Safety Council."

According to the mayor of Flix--who is a member of the Union for Municipal Progress--it is essential to discuss Asco's problems and to reach an agreement on revising the PENTA [Tarragona Nuclear Emergency Plan]. "After the Chernobyl accident, it became apparent that the PENTA provisions are inadequate," said the mayor of Flix.

He noted that, in the event of an accident, the PENTA only calls for evacuation of the population within a 3-kilometer radius around the nuclear complex, "while at Chernobyl the evacuation was within a 30-kilometer radius. The PENTA also recommends the evacuation of critical groups--children, the elderly and pregnant women--within a radius of 3 to 5 kilometers, and that is not enough."

The mayors in the Asco area are disturbed about the problems at Asco and about the heightened sensitivity among the region's population; these concerns have been increasing in recent days.

Neighbors Protest

This has become the hottest topic of news this summer in this area along the Ebro Riber.

Moreover, an antinuclear group of Asco's neighbors, headed by the former mayor of Asco, Joan Carranza, has announced that it will file suit in the courts if the Nuclear Safety Council does not immediately halt the operation of the Asco nuclear power plant.

This same group from Asco, with Joan Carranza in the lead, has also decided to undertake judicial actions against the civil governor of Tarragona for his approval of the PENTA, and against the town of Asco, for what they consider a lack of vigilance in watching out for the interests of the town's residents.

U.S. Technicians Consulted on Repairs

Madrid DIARIO 16 in Spanish 28 Aug 86 p 17

[Article by Elias Pujol]

[Text] Tarragona. Two U.S. technicians from the Paul Monroe company, which is responsible for maintenance of the safety valves in the Asco II power plant, have joined the group which has been working since last Monday on repairing the circuits connected with these valves.

With the help of these two new technicians, it is hoped to correct the problem earlier than expected, and thus to avoid the cooling of the reactor and the consequent absolute shutdown. In that case, the later startup would entail losses to the company of at least 100 million pesetas.

The bulk of the 11 shutdowns at Asco II since last March have been caused by defects in the mechanism that automatically effects the opening and closing of valves VN-3042, VN-3046, and VN-3050, manufactured by the now defunct U.S. firm, Teledyne; responsibility for these components has been taken over by another U.S. firm, Paul Monroe.

The failures in this mechanism led to the later discovery of anomalies in the safety system. Because of this failure, the closure time of the valves which shut off radioactive steam was almost 1 minute, instead of 10ths of a second, as it should be.

The Asco II nuclear power plant is now in a status technically described as "mode four," which is a "hot shutdown." If the plant remains inactive much longer, the reactor will begin to cool down. Then the shutdown would be a "mode five," which is equivalent to a "cold shutdown."

Based on what DIARIO 16 has been able to learn from sources close to the plant management, the main reason for the presence of the American technicians is to accelerate repairs of this defective valve-control mechanism, for if the problem is not corrected within the next few days, the plant will have to begin the "cold shutdown" procedure. Its later startup would then be much slower, causing greater economic damage to the company in productivity losses.

After the impact and repercussions which this failure has had in recent days, normality again returned yesterday to the management of the nuclear complex. In the meantime, DIARIO 16 has found that Asco's neighbors have been somewhat astonished by the uproar that the latest problems at the plant have awakened in the communications media. Many of the nearby residents had not been much concerned about everything that has been happening at Asco.

According to DIARIO 16's information, the three technical experts sent to the complex by the Nuclear Safety Council are maintaining complete silence about their report. It is quite possible that this report will not be completed until the middle of next week. Then it will be sent directly to the full council.

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CSO: 5100/2570

MINISTER REPORTS ON RADIATION LEVELS

Istanbul TERCUMAN in Turkish 5 Jul 86 p 3

[Text] Ankara -- Minister of Industry and Trade and Turkish Radiation Security Committee Chairman Cahit Aral stated, "Measurements are taken twice a day in Turkey. Atmospheric radiation levels range between 6 and 14 microroentgens per hour. This is the normal level of radiation existing prior to the Chernobyl accident."

Minister of Industry and Trade Aral said in a statement made on this subject:

"The Turkish Radiation Security Committee has held two meetings. Representatives from various ministries and organizations also participated in these meetings. The World Health Organization has set 2,000 becquerels per liter as the upper limit acceptable from the standpoint of human health for milk and milk products. The maximum acceptable radiation level established by the International Atomic Energy Agency is 1,000 becquerels per liter while that of Atomic Energy Agency member nations is 370 becquerels per liter. The latter accept 600 becquerels per kilogram as the highest radiation level allowable for meat, vegetables, and other foodstuffs. It has been determined that radiation existing in meat, milk, milk products, vegetables, and fruit in Turkey is far below Atomic Energy Agency limits. As was pointed out previously, radiation levels of our water, milk, vegetables, fruit, and grains present absolutely no health hazard. Our committee is monitoring the actions on this subject of other nations and international organizations. Groups of specialists are being organized in order to establish measures to be taken to prevent radiation contamination that could occur in the future as a result of accidents.

"The Turkish Atomic Energy Commission is the only agency with the authority to issue 'radiation-free' certification in behalf of our committee for food imports and exports."

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CSO: 5100/2565

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JPRS-TND-86-023
22 OCTOBER 1986

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EXECUTIVE YUAN DISCUSSES DISPOSAL OF NUCLEAR WASTE

OW261127 Taipei CNA in English 0235 GMT 26 Sep 86

[Text] Taipei, 25 Sep (CNA)--The Executive Yuan said Thursday that it has begun to improve and expand the storage facilities at the first and second nuclear power plants in order to store the used nuclear fuel up to the year 2000.

It also indicated that the Atomic Energy Council is cooperating with the Taiwan Power Company in working out medium and long-term plans for the storage of nuclear waste after 2000.

In a written response to an interpellation by Legislator Chang Chun-hsiung, the Yuan said that AEC has engaged consultant firms in the U.S. and France to make an overall evaluation of related laws in advanced nations and the geographical features and environment of this nation. AEC will then work out its policy on the storage of nuclear waste based on their research results, it said.

The Yuan also denied rumors that it was planning to build the orchid island where nuclear waste is being stored into a "nuclear power park."

It said, however, that after the nuclear waste storage facilities were built on the Orchid Island, the government did engage gardening experts to make an environmental planning of the island and invited people to visit those facilities to ease their worry about the safety of those nuclear waste on the island.

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CSO: 5100/1

NATION'S FIRST CYCLOTRON LABORATORY DESCRIBED

Budapest FIZIKAI SZEMLE in Hungarian, No 2, 86 p 80

[Article by Adam Kovach]

[Text] As a result of close to ten years of preparation and several years of strenuous work, our domestic arsenal of basic and applied nuclear research obtained a most significant addition. On November 15, 1985 ATOMKI's new acceleration laboratory, and in it Hungary's first cyclotron, was inaugurated.

It has been the consensus among industry experts for some time that it would be of the utmost importance to our domestic research to complement available facilities with the addition of an up-to-date cyclic accelerator, since that would provide opportunities which are qualitatively different and of wider applicability for both basic research and for applications. It became increasingly obvious that a cyclotron in Hungary would not only boost nuclear and atomic (basic) research, but would also signify important advances and would result in improved possibilities in many areas of application, e.g. industrial quality control, medical diagnostics and therapy, botanical improvement, etc. An increasing demand for short half-life positron radiation isotopes also indicated the need for the installation of a cyclotron. This view was further supported by experiences reviewed and information disseminated at the conference held just ten years ago, in August of 1975, in Debrecen, for the investigation of interdisciplinary exploitation possibilities of cyclotrons.

It was obvious from the start that although, at least in theory, our domestic scientific and technological background would have sufficed to build a cyclotron, it would have placed a considerable burden on the majority of our scientific and technological talent, adversely influencing their successes in other fields of endeavor. Under such circumstances, the only reasonable alternative was to purchase a cyclotron, even if it involved considerable financial commitments. In the selection of the type of cyclotron to acquire, we were handicapped from the start by the limited number of types available on the open market, and by insufficient funds at our disposal and thus, practically, the only one we could consider was the 103 cm pole diameter MGC type "compact" cyclotron made by the "D.V. Yefremov" Electro-Physical Institute of Leningrad which, in spite of its small dimensions, has various advantages for intended applications.

After several years of preparation, the Scientific Policy Committee accepted the April 1978 recommendation of the Hungarian Academy of Sciences, the National Technical Development Committee and the National Atomic Energy Committee for the creation of a cyclotron laboratory under the aegis of ATOMKI, and we were able to go ahead with the project, which turned out to be the largest investment under the 6th five-year-plan. Within the scope of its technical assistance program, the International Atomic Energy Commission, too, lent considerable financial support to our nearly 300 million forints worth of capital investment.

Based on the investment program approved in 1979, planning began in 1980 and laboratory construction was started in 1982. Building design was furnished by the East Hungarian Planning Enterprise and general contractors were the State Construction Enterprise of Hajdu County. Both planning and construction represented special tasks for the experts who had to solve a number of problems in creating optimal conditions and, at the same time, meeting radiation protection requirements. For example, construction of extraordinarily thick monolithic concrete walls and floors never before built in Hungary, necessitated the development of special concrete technology.

The cyclotron, which is the central element in the new laboratory is one of the smallest in size in the world, but its advantages (which were proved in practice in the course of jobs performed on similar installations in Finland and the USSR) allow for great versatility in application. We have summarized the cyclotron's major beam data in the table below:

Beam Data of the MGC Cyclotron

Accelerated ion	H+	${}_2H^+$	${}_3He^{++}$	${}_4He^{++}$
Energy (MeV)				
input beam	2-20	1-10	4-26	2-20
output beam	5-18	3-10	8-24	6-20
Max. intensity (UA)				
input beam	200	300	50	50
output beam	50	50	25	25
Energy dispersion	0.3%			

Major advantages of the MGC cyclotron (beside relatively low max. energy) are a wide range of beam energy variability and high beam intensity, which open up a relatively wide array of application possibilities for our domestic research (not only for the scientists of ATOMKI, but also for all institutions in need of the new laboratory's research facilities. According to the program drawn up during the preparatory stage, about one third of research work planned will involve basic research in the fields of nuclear and atomic physics. A similar proportion will be devoted to industrial and environmental research activities involving nuclear analysis. A considerable proportion of the laboratory program will be aimed at the production of short half-life, positron emission isotopes--mostly for medical purposes--for which, of course, a PET (positron emission tomograph) is indispensable. The target stations, beam conduction system and measuring center of the cyclotron have been designed to conform to the varying requirements and different needs inherent in the planned multi-purpose application, and so have the cyclotron's collateral laboratory units (radio-chemistry laboratories, separate hospital wing to assure proper patient care in cases of medical treatment administrable on the premises only etc.)

Over and above an evaluation of our possibilities, aims and requirements, carried out at several conferences, scientific seminars and meetings (some on an international level), we made sure that we have at our disposal at the outset a concrete scientific program which will allow us to effectively exploit the possibilities afforded by the new laboratory from the start. We felt that most suitable for the purpose, was the project system which, in essence, requires that any scientist who or institution which wants to use the cyclotron, must submit a written proposal of the research they wish to conduct, together with a summary of the anticipated results, specifying any other conditions necessary to accomplish the purpose of the project. The projects will be discussed at the Nuclear Research Institute (ATOMKI) in plenary session and a decision regarding acceptance and scheduling will be rendered by the Cyclotron Committee, especially formed for this purpose. We have devoted particular attention to the so-called initial-stage projects, i.e. planned research projects which, based on available collateral conditions, can be accomplished as soon as the beam is available. Such projects proposed by Nuclear Research Institute scientists as well as by other institutions (Central Research Institute of Physics, Isotope Institute, Lajos Kossuth University of Sciences Experimental Physics Faculty) are ready to get started. We are convinced that their success will fully justify the decision which enabled us to create the cyclotron laboratory.

On the occasion of the laboratory's official opening, in the presence of the President and Secretary General of the Hungarian Academy of Sciences, the representatives of the Permanent Committee for Applied Atomic Energy of the International Atomic Energy Agency and the Soviet Union as well as many invited guests, Lenard Pal, Secretary of the Hungarian Socialist Workers' Party and regular member of the Hungarian Academy of Sciences, inaugurated our country's first cyclotron laboratory.

Aladar Valek, Science Department Head of the Nuclear Research Institute at the Hungarian Academy of Sciences received the Order of Work, golden class, from the Presidential Council of the Hungarian Peoples Republic in recognition of his expert organizational and managerial activities in connection with the completion of our country's first cyclotron laboratory. Five additional persons working for the institute or the construction enterprise received the decoration "For Outstanding Work".

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CSO: 5100/3050

BRIEFS

ARGENTINE ENVOY TO BRAZIL ON MUTUAL INSPECTIONS--Argentine Ambassador to Brazil, Hector Alberto Subiza, 57, today said in Sao Paulo that "no agreement has been reached between Brazil and Argentina to facilitate mutual inspections of their development projects in the nuclear energy field." Subiza, who became head of the Argentine Embassy nearly 3 months ago, is serving in Brazil for the third time. He made the following comments: "The way our relations are at the moment, whatever we choose to negotiate we find the doors open. The diplomatic climate between the two countries is quite different, it is improving." The Argentine ambassador does not believe that the recent events which were published in Argentina and Brazil on the nuclear programs of the two countries can affect the good relations between their governments. Subiza referred to the different reactions to the matter among the public in Argentina and Brazil. "Contrary to what happens in Brazil, in Argentina there are no ecological movements opposing the construction of nuclear power plants, nothing of the kind at all." [Excerpt] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 20 Sep 86 p 4] /9604

CSO: 5100/2002

CNEA OFFICIAL CONFIRMS CONSTRUCTION OF NUCLEAR DUMP

Site Selection Requirements

PY290052 Buenos Aires NOTICIAS ARGENTINAS in Spanish 1840 GMT 26 Sep 86

[Text] Buenos Aires, 26 Sep (NA)--Elias Palacios, Radioactive Protection and Nuclear Safety member at the National Commission for Atomic Energy [CNEA], today confirmed that the government has decided to build a storage depository for nuclear waste in the Town of Gastre, in Chubut Province. He also reported that the designs for the nuclear storage depository are already being planned.

The scientist told NOTICIAS ARGENTINAS that this nuclear storage deposit, commonly known as a nuclear dump, will not be used to store atomic waste from other countries.

Palacios said that the storage dump will not have any filtrations that could affect the environment of Gastre, located nearly in the geographical center of Chubut Province.

Palacios said that "Argentina will not have any nuclear waste storage problems until the end of this century." He added that "by the first decade of the next century Argentina will need a nuclear dump to store nuclear waste safely."

He said that "the pre-feasibility study will have to be ready by next year, according to a decision we adopted in 1978 when we planned building the depository."

He said that construction costs will total between $300 and $500 million when finished, and that it will cost the population about 1 or 2 percent kw per hour.

When asked how the site was chosen, he said that "on that occasion we surveyed nearly 200 geological zones feasible for the depository. Out of these, we selected 11, and finally we chose Gastre because it will be cheaper to build there."

Palacios explained that "our main requirement was to find a granite layer capable of guaranteeing safe storage for at least 1,000 years located in an area with no seismic activity and of no mining interest because we must drill

500 meters underground and make sure that the waste that we want to store will be safe."

Concerning the possible threats to the environment in the area of the dump and to the neighboring population, Palacios said that "the safeguards will be the same as in any other nuclear activity." He sarcastically emphasized that "the waste will be protected with glass and lead to the extent that no one will die from radiation when embracing his neighbor."

Asked whether Argentina would receive radioactive waste from other countries, he stated that "there has never been any thought of building a nuclear waste dump for other nuclear powerplants. Our studies take into account the waste of only the two nuclear powerplants we have in the country and the ones that we are planning to build for the duration of their useful life-span."

As for the amount of waste that is produced daily in the country, Palacios explained that "it amounts to approximately one fuel element per day per powerplant." He explained that "there are thousands of burnt out fuel elements, but for the time being we are storing them at the powerplants and they are safe enough for 40 more years."

Speaking about accidents like the one at Chernobyl that could occur, Palacios said that "there is an element of danger in any activity," but explained that "the security of the nuclear industry is substantially greater than that of any other activity."

Palacios also said that "before the end of the year 2000, the decision to start the engineering work to build the reservoir must be made so that we can start using it as soon as possible."

In conclusion, he indicated that "once the reservoir is finished it will be the first of its kind in Latin America because the CNEA is the only organization that is conducting a serious study in this field."

Executive Branch To Decide

PY300101 Buenos Aires TELAM in Spanish 1720 GMT 29 Sep 86

[Text] Buenos Aires, 20 Sep (TELAM)--The National Commission for Atomic Energy [CNEA] today clarified the reports on the possible construction of a nuclear waste dump. It announced that the final decision on the dump will be made by the national executive branch and that pre-feasibility studies in this regard are being carried out. These studies must end in 1987.

The text of the CNEA communique reads as follows:

In reference to reports referring to the construction of a nuclear storage dump for highly radioactive waste, the National Commission reports that the statement the CNEA manager of Radioactive Protection and Nuclear Safety made during a meeting with a reporter of a news agency (which is not TELAM), was as follows:

1. In 1978, the CNEA decided to conduct pre-feasibility studies for the construction of the dump, with the purpose of detecting technological problems related to the dumping of highly radioactive waste, to identify an acceptable geological formation, and to estimate the cost of the project. This pre-feasibility study must conclude in 1987.

2. The final decision in this regard will be made by the national executive branch, with the advice of the National Commission for Atomic Energy, based on the conclusions of the studies.

/9274
CSO: 5100/2004

CONSTRUCTION OF NUCLEAR SUBMARINES REVEALED

PY300010 Sao Paulo FOLHA DE SAO PAULO in Portuguese 28 Sep 86 p 19

[By correspondent Flavio Tavares from Buenos Aires)

[Excerpts] The first Argentine nuclear submarine will be ready to sail within 2 years, Admiral Ramon Arosa, the Navy joint chief of staff, has openly revealed, thus taking the lid of secrecy off a topic that has been considered taboo in recent years in Argentina.

Only budgetary problems can delay the construction. "If budgetary restrictions do not force us to go more slowly, the country will have its first atomic submarine in 2 years," Admiral Rosa said at the Rio Santiago Naval School (80 km south of Buenos Aires) during a meeting with journalists at the end of a ceremony in which he said good-bye to officers retiring from active duty in the Navy.

The naval war industry calls for the construction of four nuclear submarines. Arosa said: "The plans are still valid and have not been changed. The goal is to build four nuclear submarines, and two of them are in an advanced stage."

In addition to the nuclear submarine project, a project to build two missile-carrying frigates is under way. Admiral Arosa expalined that "the project is not proceeding as rapidly as we would like, because we have to make accommodations for the shortage of resources. Their construction will be slower, and we have to have patience, but the project will be completed." Admiral Arosa's post is equivalent to that of the navy minister in Brazil.

He did not reveal where the nuclear submarine project is being developed. However, everything seems to indicated that it is being carried out at two shipyards. One of them is Avellaneda, in the very metropolitan area of Buenos Aires, less than 5 km from the Casa Rosada, the Argentine Government House. A project based on FRG technology has been in development there for at least 7 years.

In another shipyard, near the city of La Plata, 70 km south of Buenos Aires, near the seacoast, the Navy is coordinating work on the construction of a nuclear reactor, based on designs completed by the National Commission for Atomic Energy [CNEA] in 1982.

At that time, CNEA President Admiral Jose Castro Madero publicly revealed that the construction of a nuclear submarine "was under study." Since the end of the Malvinas war (June 1982), however, nothing else has been heard about this study.

Slightly more than a month ago, nuclear engineer Jorge Cosentino during an interview he gave to FOLHA gave a clue in the story on the Argentine nuclear submarine. He told FOLHA that "some years ago" a navy captain completed the "viability" and "feasibility" study for the construction of a nuclear submarine. The captain was a member of a team that during the military regime occupied two stories of a building owned by the CNEA at 3619 Arribenos Street, in Buenos Aires, a few blocks from the CNEA headquarters. Although he is not an expert in military affairs, engineer Cosentino explained in that interview that perhaps the Argentine route to acquire a nuclear submarine was to transform a conventional unit, like the United States did in 1952. The first U.S. nuclear submarine, the Nautillus, resulted from the transformation of several conventional submarines and the replacement of the diesel engine with a compact nuclear reactor.

A few days ago, the most important Argentine nuclear physicist, Mario Mariscotti, gave us another clue regarding the construction of the nuclear submarines. He denied that the CNEA, where he is head of the research section, has tried to develop plans for the construction of a nuclear submarine, but left an alternative open.

Physicist Mariscotti, in his office at the CNEA building, expressly told us: "There is nothing at the CNEA on that. I do not know anything about it. Perhaps there might be something at the Defense Ministry."

He told the truth. The plan for the construction of nuclear submarines was taken out of the hands of the CNEA (which has had a monopoly over nuclear activities in Argentina) and moved to the Defense Ministry and placed under the direct coordination and supervision of the Navy. Apparently, the same naval experts who during the dictatorial military governments worked on the "Technical viability" project at the CNEA are now heading the submarine construction project. [passage omitted]

/9274
CSO: 5100/2004

RESEARCH ON ALTERNATE URANIUM ENRICHMENT METHOD

PY181647 Rio de Janeiro O GLOBO in Portuguese 15 Sep 86 p 16

[Article by Ramona Ordonez]

[Text] This year's expenditures of 300,000 cruzados do not even equal the proceeds from tickets to a soccer game, but, if the results are positive, they will ensure for the country the expertise to enrich uranium, the fuel for nuclear electricity-generating plants. Since 1980, the Nuclear Engineering Institute (IEN) of the National Nuclear Energy Commission (CNEN), headquartered on Fundao Island in Rio de Janeiro, has been conducting research on the enrichment of uranium through a chemical method which the scientists called Green-yellow Method for the two colors that uranium takes on in its liquid form. Uranium enrichment know-how has strategic value for any country that wants to be independent in the area of nuclear energy. If Brazil lacked this know-how it would be as though it had not developed the technology to produce and refine crude oil.

The research to enrich uranium by the chemical process now being developed at the IEN is part of the so-called Parallel Nuclear Program, which is being conducted by the CNEN in cooperation with the Nuclear Energy Research Institute (IPEN) of the Sao Paulo University (USP) and the Brazilian Armed Forces. The nuclear-propelled submarine that is being developed by the Navy is the project that has progressed fastest under the Parallel Nuclear Program.

The IEN is also conducting important research on electronic instruments for the Critical Unit (nuclear research reactor or zero power reactor) of the IPEN where the material for the nuclear submarine project will be tested. This year, the IEN will invest 20 million cruzados, and its director, Alcir Mauricio, believes that the government decision to encourage research in the nuclear area plus the decision to slow down the pace of expenditures in the Nuclear Program being executed by NUCLEBRAS, will henceforth make more resources available to the IEN. Alcir Mauricio said that he is more concerned about the lack of human resources, which are in shortage because of the low salaries and unpromising future of nuclear energy in the country.

The chemical process of uranium enrichment is in the laboratory stage and, if resources are available, the IEN intends to start the construction of a pre-pilot plant next year. According to the Chief of the Enrichment Division of IEN, Joao Soares Rodrigues, the chemical method is simpler and less expensive than the jet nozzle method being developed by NUCLEBRAS. In the chemical method, the ore does not have to be converted into uranium hexafuoride, a very poisonous gas.

Joao Soares Rodrigues explained that the chemical method is also being developed in Japan, where more progress has been made, to the point that pilot plant for demonstration of the process will go in operation this year. In addition to being simpler, and thus more convenient for a developing country like Brazil, the chemical enrichment process cannot produce plutonium for the manufacture of atomic bombs, because this method can only enrich uranium by 3 percent, not by the 90 percent necessary for weapons. The Chief of the Enrichment Division of IEN believes that in 4 or 5 years, Brazil [will] have the first pilot plant for enriching uranium through the chemical process in operation.

The Instruments and Controls Laboratory of IEN is one of the largest of this type in Latin America, according to its head, Hilton Andrade de Mello. And among other things, this laboratory is developing nuclear medicine instruments, which at present are being imported. A tyrod scanning instrument is being developed and tested.

Another important project being developed at this laboratory is related to electronic instruments to be used in the Critical Unit (nuclear research reactor or zero power reactor) of IPEN, in Sao Paulo, to test the materials that will be used in the nuclear submarine project. The know-how developed by this laboratory is transferred to the national industry.

Research for developing the technology of 'fast-breeders', which are known worldwide as the reactors of the future, because they produce more fuel than they can consume, is being conducted by the Reactor Department. Several European countries are jointly developing that high-cost technology and France has built a reactor called Phoenix (the bird that rises from ashes). According to Reactor Department chief Luis Aghina, the research work is behind schedule due to the lack of funds. The IEN has imported from Italy a complex system of sodium circuits for testing materials for the breeders. However, the sodium circuits were stocked abroad for 1 year and have been stocked for more than 1 year at an IEN warehouse. They cost $10.5 million (145,3 million cruzados) and $1.5 million (20,7 million cruzados) will be required to install them. Their installation is complicated.

The IEN was established conducted by a group of CNEN engineers at the Argonne National Laboratory in the United States. The Argonaut, the first zero-power reactor for training and tests completely built in Brazil was completed as early as 1965. Its equipment and operational instruments were all built in Brazil and developed by the IEN. The Reactor Department chief explained that were it not for the fact that the research virtually stopped for a long period, Brazil would now certainly be much closer to the capability of building a completely Brazilian-made nuclear power plant without having to negotiate technological packages abroad.

/9604
CSO: 5100/2001

INDUSTRIAL ADVANCEMENT UNDER NUCLEAR PROGRAM NOTED

PY231346 Rio de Janeiro O GLOBO in Portuguese 22 Sep 86 p 15

[Text] Sao Jose dos Campos, Sao Paulo -- The Parallel Nuclear Program initiated in 1980 -- with the objective of learning the whole nuclear energy cycle and independent of the cooperation agreements signed with the FRG -- is yielding positive results including significant advances in the areas of metallurgy, engineering, the manufacture of scientific equipment for nuclear research and medical use, progress in atomic reaction research, and the participation of industry in several areas of the program.

Part of the research work is being conducted at the Advanced Studies Institute (IEAV), which is subordinate to the Airspace Technical Center of the Aeronautics Ministry in Sao Jose dos Campos. One of the IEAV basic lines of research is the study of fast breeder reactors using thorium as fuel, and the enrichment of uranium through the use of laser rays.

According to military sources, the IEAV is expected to give Brazil the capability to master the technology of the entire nuclear fuel cycle by the next decade, thus ensuring the country's autonomy in this area. According to the IEAV plans, expertise in this technology will make it possible for Brazil to have, early in the next century, its own fast breeder nuclear reactors which are almost inexhaustible in their capacity to produce energy.

According to assessments that have been made, Brazil's thorium reserves should be sufficient to supply the country for 1,300 years, while uranium reserves to supply the Angra dos Reis nuclear plants have a potential of slightly more than 100 years.

Brazil has the second largest known thorium reserves in the world -- 1.27 million tons -- and its utilization in the fast breeder reactors will be more economical since these reactors generate plutonium, which refuels the reactor. To master this process, CTA experts have opted for a process that enriches uranium by exciting its atoms using laser rays.

The laser uranium enrichment method was presented for the first time in 1979 by researcher Sergio Porto from the Brazilian Physics Research Center (SBF). The CTA and the IEAV have established an informal cooperation program to exchange information and experience in the nuclear area with Argentine experts. This informal program has been going on for at least 4 years. This research work has produced results which have already been transferred to the national industry and to the medical field.

/9274
CSO: 5100/2003

BRIEFS

SARNEY ON NUCLEAR RESEARCH--Assessing his visit to the United States in a press interview yesterday, President Jose Sarney, 56, said that Brazil will face more commercial conflicts with developed countries. The reason for the conflicts lies in the fact that Brazil's economic growth prompts it to move into "new spaces," into "disputed areas," thus affecting the interests of other countries. Consequently, Sarney said that "it is possible" that he will make trips to Europe and Japan to explain the Brazilian positions. President Sarney finally guaranteed that Brazil is not interested in building an atomic bomb. He explained that nuclear research is directed at peaceful uses. To show that Brazil is a "peaceful" country, Sarney mentioned the Brazilian proposal for the total demilitarization of the South Atlantic--not even permitting the transport of weapons through that region. [Excerpts] [By Gilberto Dimenstein] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 14 Sep 86 p 5 PY] /9274

NAVY FACTORY NEAR SOROCABA--The Navy Ministry is summoning mayors and councilmen of the Sorocaba region, in the state of Sao Paulo, to explain to them about the factory being built by the Navy in the (Tero) municipality, 25 km from Sorocaba. It had been said that it will be used to build atomic reactors for submarines, but Navy Ministry sources have officially assured that only components will be manufactured in the factory. [Text] [Sao Paulo Radio Bandeirantes Network in Portuguese 1600 GMT 23 Sep 86] /9604

CSO: 5100/2002

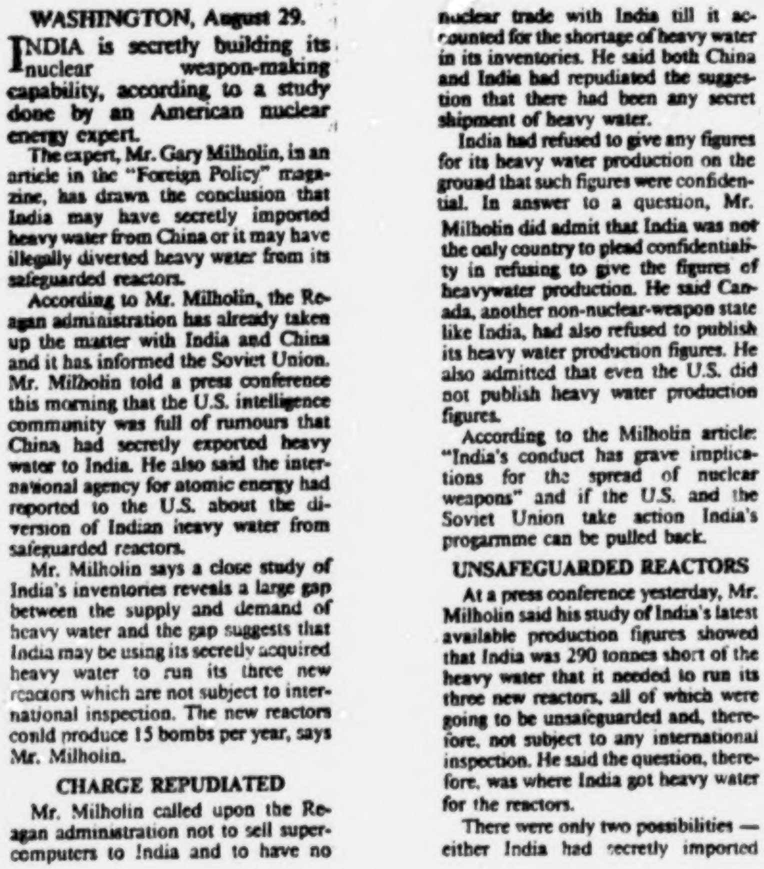
ACCUSATIONS OF HEAVY WATER IMPORT DENIED

FOREIGN AFFAIRS Article Reported

Bombay THE TIMES OF INDIA in English 30 Aug 86 p 9

[Article by J.N. Parimoo]

[Text]



WASHINGTON, August 29.

INDIA is secretly building its nuclear weapon-making capability, according to a study done by an American nuclear energy expert.

The expert, Mr. Gary Milholin, in an article in the "Foreign Policy" magazine, has drawn the conclusion that India may have secretly imported heavy water from China or it may have illegally diverted heavy water from its safeguarded reactors.

According to Mr. Milholin, the Reagan administration has already taken up the matter with India and China and it has informed the Soviet Union. Mr. Milbolin told a press conference this morning that the U.S. intelligence community was full of rumours that China had secretly exported heavy water to India. He also said the international agency for atomic energy had reported to the U.S. about the diversion of Indian heavy water from safeguarded reactors.

Mr. Milholin says a close study of India's inventories reveals a large gap between the supply and demand of heavy water and the gap suggests that India may be using its secretly acquired heavy water to run its three new reactors which are not subject to international inspection. The new reactors could produce 15 bombs per year, says Mr. Milholin.

CHARGE REPUDIATED

Mr. Milholin called upon the Reagan administration not to sell supercomputers to India and to have no nuclear trade with India till it accounted for the shortage of heavy water in its inventories. He said both China and India had repudiated the suggestion that there had been any secret shipment of heavy water.

India had refused to give any figures for its heavy water production on the ground that such figures were confidential. In answer to a question, Mr. Milholin did admit that India was not the only country to plead confidentiality in refusing to give the figures of heavywater production. He said Canada, another non-nuclear-weapon state like India, had also refused to publish its heavy water production figures. He also admitted that even the U.S. did not publish heavy water production figures.

According to the Milholin article: "India's conduct has grave implications for the spread of nuclear weapons" and if the U.S. and the Soviet Union take action India's progamme can be pulled back.

UNSAFEGUARDED REACTORS

At a press conference yesterday, Mr. Milholin said his study of India's latest available production figures showed that India was 290 tonnes short of the heavy water that it needed to run its three new reactors, all of which were going to be unsafeguarded and, therefore, not subject to any international inspection. He said the question, therefore, was where India got heavy water for the reactors.

There were only two possibilities — either India had secretly imported heavy water or it had clandestinely dodged the inspection mechanism of the International Atomic Energy Agency and diverted heavy water from safeguarded reactors to use it at the new unsafeguarded reactors.

The three unsafeguarded reactors would give to India, according to Mr. Milholin, its first chance to build a nuclear arsenal. Until recently India, according to Mr. Milholin, had only small quantities of plutonium but now that position had changed.

'DISHONEST' PROJECT

Mr. Milholin said that to him India did not seem to run its nuclear programme "honestly." He thought the new phase in India's nuclear programme would put tremendous pressure on Pakistan and eventually fuel a nuclear arms race in south Asia. He said if in the new situation Pakistan were to test or to assemble a nuclear weapon the U.S. would cut all its aid to Pakistan and that would cripple U.S. efforts to combat the Soviet occupation of Afghanistan.

Mr. Milholin was told his theory that China had exported heavy water to India did not seem credible because China would not like to help its regional rival to build a nuclear arsenal when it knew such an arsenal would militate against the defence interests of its close ally, Pakistan.

He parried that China was so short of foreign exchange that it could have ignored its long-term interests to make short-term gains. He said China did not treat India as a nuclear rival because India was far behind China in this matter.

Mr. Milholin said he did not go to India to make the study but admitted he had access to U.S. intelligence sources. Asked if he had consulted the state department, he said the state department was aware of his study. He said he would advise the U.S. administration to put pressure on India to push back its programme.

Bombay (PTI): Top officials of the Department of Atomic Energy (DAE) today categorically denied the U.S. charges.

The sources pointed out that because of some technical reasons the country was importing "some quantity" of heavy water from the Soviet Union, "but this is being done under an open agreement following the safeguards of the IAEA."

Denial From India

Madras THE HINDU in English 30 Aug 86 p 1

[Text] BOMBAY, Aug. 29.

Top officials of the Department of Atomic Energy (DAE) today categorically denied charges that India was obtaining the heavy water to run its three latest reactors either by importing it secretly or by diverting from other reactors.

The allegations were made in a Washington-based report quoting an article in the forthcoming issue of the *Foreign Policy* magazine which suggested China as the potential source of secret import.

"Our heavy water production capacity is sufficient to meet the demands of all the reactors in the country including the Dhruva Research Reactor at BARC in Bombay", highly-placed DAE sources told PTI.

The sources pointed out that because of some technical reasons the country was importing "some quantity" of heavy water from the Soviet Union, "but this is being done under an open agreement following the safeguards of the International Atomic Energy Agency (IAEA)".

The IAEA representatives would be physically present to ensure that the safeguards are observed, they said.

The sources also ridiculed the suggestion that China could be the source of secret import of heavy water and said: "India would be probably the last country to receive heavy water from China".

PRC Denial Reported

Calcutta THE TELEGRAPH in English 4 Sep 86 p 1

[Text]

Beijing, (PTI): China has dismissed as "highly groundless" a report in the US *Foreign Policy Magazine* that it might secretly be selling heavy water to India to help run its three newest nuclear reactors.

Both China and India have previously denied allegations of secret transactions in heavy water.

Meanwhile, a top Chinese nuclear scientist has said Beijing is making headway in its research on the recycling and reprocessing of nuclear fuel, a project vital to the safety of nuclear power stations as it would ensure safer disposal of spent nuclear fuel.

/13046
CSO: 5150/0012

NUCLEAR POWER BOARD CHAIRMAN ON HEAVY WATER AVAILABILITY

Bombay THE TIMES OF INDIA in English 31 Aug 86 p 7

[Text]

BOMBAY, August 30.

THE Rajasthan Atomic Power Station (RAPS) — unit II is the only nuclear reactor in the country which uses non-indigenous heavy water, imported from the Soviet Union under international safeguards, senior officials of the department of atomic energy (DAE) said here today.

Under bilateral agreement with the Soviet Union, heavy water is being supplied to RAPS - II, which was subjected to inspection by experts from the International Atomic Energy Agency (IAEA), Dr. M. R. Srinivasan, chairman of the Nuclear Power Board (NPB), told this paper.

Refuting reports that the DAE was in the process of acquiring a nuclear-weapons capability, diverting heavy water from its safeguarded reactors, and also importing heavy water from China, Dr. Srinivasan described them as "not true."

He noted that the start-up of the Madras Atomic Power Station (MAPS) - I had been delayed by one year due to the non-availability of heavy water. It was during this period (1980-81) that the DAE embarked upon setting up a series of heavy water upgradation plants at Rajasthan and Madras, he said.

These upgrading facilities, which employ either the electrolytic or the distillation processes, were needed to restore the 99.9 per cent nuclear-grade purity of heavy water and for re-use at nuclear plants. However, only downgraded heavy water from unsafeguarded nuclear plants were used for this purpose, he stressed.

Heavy water plants had been set up at Baroda, Tuticorin, Kota, Talcher and new ones were coming up at Thal-Vaishet near Bombay, and Managuru, he said.

There was nothing unusual in the DAE not giving out its heavy water production figures, he said, and added that even in the U.S. and Canada these figures were confidential.

Mr. Gary Milholin, an American nuclear energy expert, had alleged that India was clandestinely importing heavy water from China to offset a large gap between the supply and demand of heavy water in the country. He also alleged that the DAE was diverting heavy water from safeguarded nuclear plants.

In this context, Dr. Srinivasan pointed out that the heavy water used in the safeguarded installations were fully accounted for to the IAEA. The IAEA had not expressed any misgivings on them.

Parts of the study conducted by Mr. Milholin had been reported in the U.S. media a few months ago. The study appears to have been solely on India's nuclear programme, and more specifically with regard to the production and use of heavy water in this country, highly-placed sources said.

/13046
CSO: 5150/0014

PAPER INTERVIEWS NUCLEAR POWER BOARD CHAIRMAN

Calcutta THE TELEGRAPH in English 31 Aug 86 p 9

[THE TELEGRAPH interview with Dr M.R. Srinivasan, chairman, Nuclear Power Board; date and place not given]

[Text]

Dr M.R. Srinivasan, chairman, Nuclear Power Board, is one of the country's seniormost nuclear engineers. From playing a minor role in the construction of Apsara, India's first research reactor, to holding the pivotal post of chief construction engineer of the Kalpakkam power plant, Dr Srinivasan has been intimately involved in almost every phase and aspect of nuclear power generation in India.

In 1974, Dr Srinivasan was made the director of the power projects engineering division of the Department of Atomic Energy (DAE) and given the responsibility of design, construction, commissioning and operation of all atomic power stations in the country. As the emphasis shifted to producing more and more nuclear power, the body was reconstituted as the Nuclear Power Board and Dr Srinivasan was appointed its first chairman in 1984.

Q: Dr Srinivasan, as chairman of the Nuclear Power Board, how would you assess India's performance in the field of nuclear power generation to date?

A: If you look at the programme from the point of view of technological capability, then we have succeeded in establishing comprehensive capability in the entire gamut leading to nuclear power generation. For instance, in activities like mining of uranium, extraction of uranium ore, production of nuclear fuel, capability for designing and building an atomic power plant.

The power that we actually generate from the atom at the moment is of the order of three per cent. The world average is about 15 per cent. So from the standpoint of contribution to electricity production in the country, it is somewhat modest. But we are poised for a fairly important role and, by the end of the century, we hope to reach a target of 10,000 MW, which would then be something like 10 or maybe 15 per cent of the electricity generated in the country.

So one can say that what we have done so far is in the nature of developing a comprehensive capability and prototype activity. The challenge of the next decade and a half is to industrialise this infrastructure to make it into a commercial activity.

Q: How does nuclear power generation in India rank in terms of output and cost effectiveness?

A: The cost effectiveness has been established. We are supplying power from nuclear stations at a cheaper rate than coal-based stations in the Bombay, Madras and Rajasthan regions. So the economics are not in doubt. Our challenge is to increase the nuclear power generation rapidly from about three per cent to 10 or 15 per cent. And perhaps more in times to come.

Q: But there is a feeling in some quarters that since we embarked on nuclear power generation, the programme has been dogged by trouble.

A: This is purely a subjective feeling. One has to understand that this is a new technology that the world as a whole has been learning and that we have had to establish self-reliance in a very advanced area of technology. It goes without saying that one does encounter problems. Problem solving is the very basis of creation of self-confidence. I can only say that when any new technology which is still in its infancy is adopted, one has to be prepared to face these problems.

The important thing is how well we have been able to cope with these problems, and here I think we have done well.

Q: And what would you say are our major successes in the field?

A: Well, when we set out to make nuclear fuel in the early stages—only four or five countries had the capability then—a lot of people did not think we could do it. At one point many people did not believe we could even make zirconium, which was considered a difficult task. Much later in 1983, it was the designing, building and commissioning of the Kalpakkam power station which was a completely indigenous effort, which impressed many countries. India is the only developing country that can claim such an achievement—the other countries that have done this include the United States, the Soviet Union, Britain, Canada, Germany, Sweden and Japan. Even China, with its well-known nuclear weapons programme, has not, even to this day, designed a nuclear power plant on its own.

Earlier too, with the building of the plutonium plant in the Sixties, India became one of the very few countries which entered the field of separating spent fuel and plutonium. Similarly in the field of heavy water production—we are the only country that has the expertise and experience in three processes of making heavy water.

Q: I suppose these successes have to be looked at against the background of some of the failures, especially the number of breakdowns.

A: You see, any interruption in the operation of a reactor, the newspapers seem to report as breakdown. It is rather like when you put on the television set and it does not show a picture, you call it a breakdown. In the case of the nuclear industry every such malfunction is documented, it is then analysed, the causes established and corrective action taken. We call them unusual occurrences. And there is a regular systematic review of these unusual occurrences.

If I have to give an example—a fuse may blow up. In ordinary circumstances, one just replaces the fuse. In the case of a nuclear plant we establish what the consequences of the fuse failure are and if the consequences are such that it would either disrupt the operation of the reactor or cause concern for safety, then we take steps to duplicate the fuse so that a single fuse failure does not give rise to a problem of that kind. We also have instrumentation to announce that one of the two fuses has failed.

The point I am trying to make is, what you call a breakdown in the newspapers is an interruption in the operations. If you look at any other type of power stations like say thermal power stations there are many more interruptions. Now as of today, Rapp-2 has been operating continuously for 120 days non-stop. Last year Tarapur operated continuously for six months. The conventional thermal power stations in the country have much shorter continuous runs.

The test really is to see whether we have derived high utility from the installed capacity in the power stations. In our case, with the exception of Rapp-1, the stations have been having very good capacity and availability factors. We do have failures of conventional equipment, for instance in Madras we had some problem in the turbine generator and main transformer. But these are conventional equipment problems and we believe that equipment must be made to higher and higher quality. But that is again a learning process in the country. It takes time for things to improve. But these breakdowns don't constitute any safety hazards to the plants or the people who are working there or to the environment.

Q: But the interruptions, as you put it, have been too frequent. Kalpakkam, for instance, had to be switched off only days after Mrs Gandhi inaugurated it.

A: The Kalpakkam incident has been well documented. We synchronised the unit for the first time just half an hour before Mrs Gandhi arrived. It was not expected that after Mrs Gandhi switched on the reactor, it would work without a break thereafter. The point to note is the capacity factor of the Madras reactor: in the very first year, it was over 60 per cent and the availability factor was over 80 per cent. Which is extremely good. So a breakdown which takes place does not invalidate the overall performance.

You should ask the electricity people in Tamil Nadu, they will tell you how happy they are at the functioning of the Madras reactors. Barring, of course, the problems we faced with the vibrations when we had to take the units off for some time and the transformer problem. Just now we have a problem in Madras unit 2 relating to the fuel transporting system which is being attended to. In going in for such modern technology one has to be prepared to learn. After all Madras-2 was only our sixth reactor. Many people compare our nuclear programme with the American or the French programme where they have over a hundred reactors.

Q: At the same time, there is a feeling that while the western countries are moving away from nuclear power generation, we are placing more emphasis on it.

A: These things have to be looked at in perspective. Just the statement that the Americans are not building any more nuclear reactors does not convey the fact that they have a hundred reactors already operating and another 70-80 reactors are due to be commissioned. In the next four-five years they will be having something like 140,000 MW of nuclear power. Now compare that with 40,000 MW of total power in this country.

The French are already supplying 60 to 70 per cent of their total power from nuclear energy. They have about 40 to 50 reactors. They are not adding more reactors because for their population and their requirement of electricity, there is a certain saturation point. We are nowhere near saturation point.

Electricity is desperately needed in this country. Our options are extremely limited. Our coal has got 40 or 50 per cent ash. It is really a piece of rock with some calorific content and it is extremely difficult to burn it. The coal based power people will tell you what a misery it is to burn this coal, the problems they have with the boilers and other equipment and how rapidly they keep wearing off and how difficult it is to keep the plant going. With hydro projects we have problems of rehabilitating people, submersion of forests. So where are the options?

/13046
CSO: 5150/0016

TROUBLES WITH NUCLEAR POWER PROGRAM REVIEWED

Calcutta THE TELEGRAPH in English 31 Aug 86 p 9

[Excerpts]

Among the several targets India has set for itself in its march to the 21st century is generation of 10,000 MW of nuclear power by the year 2000. But a couple of major disasters, along with increasing resistance by environment protection groups against the setting up of atomic power plants threaten to reduce this target to just another statistical projection. Although the high influence-low profile nuclear establishment in the country is trying to play down the extent of the setback, the last few years have seen India's nuclear programme on a downslide, after an excellent start it had in the Sixties and Seventies.

The major setback to the country's nuclear power programme is the virtual shut down of the Rajasthan atomic power plant unit one (Rapp-1).

While it became virtually certain that Rapp-1 would not function again—at least not in the near future—the DAE received another jolt when a fire accident severely damaged vital components at the Talcher heavy water plant in Orissa in April this year. Like Rapp-1, the Talcher plant has also been an albatross round the DAEs neck, its commissioning delayed by 11 years and its output negligible compared to its installed capacity.

To attain the target of producing 10,000 MW of power, Indian nuclear planners envisage building more than 10 nuclear reactors in the next 15 years. The nuclear programme has just stepped into its second accelerated phase now. Only three main plants at Tarapur in Maharashtra, Rajasthan, and Kalpakkam in Madras are generating power so far. The Tarapur atomic power station (Taps), with its two units, completed 16 years of operation in November last year. Between them Taps-1 and Taps-2, have generated more than 30,000 million units of power.

However, both reactors, notably Taps-1, have been bogged by problems. Early this year, Taps-2 had a continuous run of 189 days, bettering its previous best of 133 days in 1984. Last year, Taps-2 had an availability factor of 92 per cent and a capacity factor of 84 per cent, the corresponding figures for Taps-1 was 71 per cent and 62 per cent respectively.

Similarly, the performance of Raps-2 has been encouraging as compared to the ill fated Raps-1. While Raps-1 managed to generate only 260 million units of power before it collapsed, Raps-2 generated 1098 million units during 1985 which was the highest generation level attained by the unit so far. The capacity and availability factor of Raps-2 during 1985 were 57 per cent and 71 per cent respectively.

The Madras atomic power station unit one (Maps-1) also performed poorly last year, generating only 946 million units at 46 per cent capacity and 55 per cent availability. The unit had two major outages during the year, caused by vibration problem in the turbine generator.

While Taps, Raps and Maps are plodding along gamely in the face of design and engineering problems, the DAE has been facing a new kind of resistance in the new plants it has envisaged for the next decade. Awkward questions have sprung about the decision to locate the two units at Narora, Uttar Pradesh,on what is undeniably an earthquake zone. The DAE, however, insists that it is designing the reactors taking into account the seismic factor. DAE engineers point out that Japan has also built reactors in earthquake prone zones, with adequate safeguards in design. However Naps-1 and Naps-2 are certain to be delayed even further due to the hold up in the delivery of steam generators. Although the Naps units, on which work began in 1974, were scheduled to be completed in 1981 and 1982, respectively, it is unlikely the units will be commissioned before 1988.

Work at Kakrapara is, however, progressing satisfactorily despite protests by environmentalists and any delay in the project scheduled to be completed by 1991 will be marginal, according to the DAE.

The ambitious Kaiga project ran into problems even before work on the plant began. The Kaiga units are located in the North Kanara district of Karnataka which has about 80 per cent of forest cover. For the first time, the DAE was forced to hold a dialogue with the local population to convince them there that there would not be large scale destruction of forests as they had feared. But while the agitation continues unabated, the DAE is going ahead with the Kaiga project which it hopes to complete by 1994.

While the units commissioned so far have been in the 210-235 MW range, to accelerate towards the target of 10,000 MW by 2000 the DAE soon plans to go in for the 500 MW reactors. Conceptual design, preparation of feasibility report, appointment of main consultant for all conventional systems and all plant structures for different inland sites have been completed and the preparation of detailed project reports are in progress. But the DAE has already initiated action for advance procurement of material and components and for placement of orders for indigenous manufacture of long delivery equipment. The first 500 MW reactors are expected to come up in Rajasthan and later at Kaiga.

Once the 235 MW units are put up at Kaiga, the DAE plans to switch over entirely to the 500 MW units. However, even with this transition, India may still find it difficult to meet its power needs in the next century. A quantum leap in meeting these needs is expected from the new generation fast breeder reactors on the lines of the experimental FBTR in Kalpakkam. Conventional nuclear reactors being built in the country are regarded as primitive when it comes to the utilisation of uranium. The uranium reserves in the country can support a 15,000 MW conventional reactor-based programme for about 30 years and with 10,000 MW target fixed for 2000 India may run out of this by about 2050.

Fast breeders can extract 70 times more energy from every unit mass of uranium and are seen as a cornucopia of power in the years to come. Western countries have invested large sums of money to develop fast breeder reactors. India too has not lagged behind, but without the uranium enrichment facility, it has had to tread a different path to come up with a suitable fuel mixture. Indian scientists expect the first of the 500 MW prototype fast breeder reactors to be operational in the first decade of the next century.

But while nuclear scientists are drawing up grand plans for generating more and more power from the atom, increasing doubts are being expressed at other levels about the advisability of opting for nuclear power on a large scale. Opponents of nuclear power point out that across the world countries are shying away from nuclear energy and are investing more on exploiting renewable sources of energy. Even in the case of the fast breeder reactors the US and Japan have deferred their projects. Opinion against nuclear power has been gaining momentum in the face of accidents like the Three Mile Island and Chernobyl.

While the DAE plans to put up 22 reactors by 2000 at an estimated cost of Rs 15,000 crores, opponents of nuclear power point at the several breakdowns and outages Indian nuclear plants have suffered even during their limited operations.

However, there is no escaping the fact that nuclear energy represents the only realistic chance to meet the country's power requirements during the next century. With an installed capacity of only 43,000 MW India is already into a massive power crunch that is only going worse each year. The projected power demand by 2000 is more than 75,000 MW. With limited coal reserves, poor quantity of coal and coal mining becoming more costly and hazardous, the emphasis could be on hydroelectric power. But there has been resistance even to the hydroelectric projects besides the uneven distribution of hydroelectric power potential across the country. In the long run, nuclear power seems the only way out, but whether the nuclear establishment can overcome the crises of the Eighties is the immediate concern.

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CSO: 5150/0015

INDIA'S FIRST NUCLEAR POWER PLANT WRITTEN OFF

Bombay THE TIMES OF INDIA in English 31 Aug 86 p 7

[Text]

JAIPUR, August 30.

INDIA'S first atomic power plant at Kota (RAPP-I) is destined to become a "historical monument".

The 220-MW plant, shut down for almost four years, has been finally written off by the atomic energy department for want of necessary technology and massive funds needed for sealing the cracks in the end-shield of the reactor.

Ironically, the plant can neither be dismantled nor even buried. While technology for dismantling it is not available anywhere in the world, the burial is also fraught with danger, cement being porous. The plant will, therefore, remain "in position" after decommissioning. Dispelling doubts of leakage, experts consider this alternative as the safest.

A Chernobyl-type mishap in this state is ruled out by them on the ground that, unlike the Russian plant, the Kota reactor is properly domed. The plant may, of course, bring devastation on a vast magnitude if it is hit by an earthquake in the next three decades, after which the radio activity of the plant will automatically die down. Heavy water has been drained out of the plant and after taking out the fuel, it will be sealed. Monitoring of radio active emission from "probes" will be necessary.

In a recent communication to the Rajasthan state electricity board, the nuclear power board has said, "In its targets of power generation, it had not indicated any generation for RAPP-I during 1986-87." The communication explains that the atomic energy department had developed and fabricated the closure plugs required for sealing the cracks in the end-shield. These plugs were installed in RAPP-I last month and their effectiveness was found to be satisfactory. Surprisingly, one more crack was discovered during the subsequent tests. This new crack was not revealed in the earlier inspection in1985 using hydro, helium, acoustic emission and ultrasonic techniques, probably due to the incipient state of the crack.

The performance of RAPP (unit I) installed in the early seventies, at a cost of about Rs. 180 crores in collaboration with the Canadian government, has been dismal while unit II, having the same technology, has shown a record performance. Notably, the difference between the two is that RAPP-I has complete Canadian collaboration whereas the content of Canadian collaboration in RAPP-II is just 20 per cent, the rest being wholly indigenous.

During the past four years, RAPP-I has been a constant headache to the atomic energy department as well as the state government. It has remained closed for 8,070 hours in 1984-85, 7,579 hours in 1985-86 and 3,672 hours in 1986-87 up to July 31, 1986. Incidentally, after remaining closed from March 1982 to January 1985 the unit started functioning on February 1, 1985 and its 50-day continuous run had revived hopes. But it let down the experts again on May 20, 1985. Earlier, efforts to run it at a reduced capacity of 120 MW had proved futile.

Unit-II, installed in April, 1981, produced 1,150 million units between April 1985 and March 1986. It had an outage of only 2,561 hours in 1984-85, of 2,546 hours in 1985-86 and of 151 hours during April and May this year. The number of trippings was 17 in 1984-85, 12 in 1985-86 and four during April and May this year.

The total closure of RAPP-I will deal a crushing blow to the infrastructure of the state which has been reeling under a power crisis for many years. By the end of the seventh plan, during which two thermal power plants of 20 MW each and a gas-based plant of three MW and micro-hydel schemes of 31 MW are to be installed, the shortfall will jump to 1,300 MW as against the estimated 1,080 MW.

It is because of the continuous shutdown of unit I that the state government has been pressing the Centre for the allocation of extra power from the unallocated reserve available at Singrauli. But it has so far failed in its efforts.

Rajasthan's other grievance is that it was refused permission for setting up thermal generation units because of the supply of power from the two RAPP plants.

This apart, the state electricity board as a consumer of the RAPP will have to suffer a financial loss of about Rs. 32 crores per annum due to the closure of unit I, as the board was getting power from RAPP at the rate of only 35.49 paise per unit.

Also, the present tariff was worked out by the atomic energy department on the basis of the investment on both the units. Since one unit has been closed, the AED will be far from justified in charging the old rate, remarked an official of the state electricity board.

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CSO: 5150/0013

BARC DEVELOPING THORIUM FUEL FOR NUCLEAR REACTORS

Madras THE HINDU in English 26 Aug 86 p 11

[Text]

NEW DELHI, Aug. 25.

Thorium rods made from Kerala's beach sands are being bombarded by neutrons from a Swiss accelerator at Lausanne in a historic experiment that may show the world a short-cut for producing energy from thorium.

The Bhabha Atomic Research Centre (BARC) scientists, who are carrying out the experiment since 1984, say it will provide them data for a "fusion-fission hybrid reactor", that will take in thorium, put out electricity as well as fuel for additional reactors, but create no hazardous, long-lived nuclear wastes".

Enormous amounts of energy are locked up in the country's 350,000 tonnes of thorium reserves and India's current strategy for harnessing thorium is through a long route, requiring construction of a string of fast breeder reactors (FBRs).

The Indo-Swiss experiment at Lausanne's Ecole Polytechnic will provide an alternative to the controversial FBRs for exploiting India's thorium on a time scale much shorter than envisaged by the late Homi Bhabha, it is said.

'Spallation' process: Between the Swiss accelerator and the Indian thorium is a plate of lead where each incident-neutron is multiplied several-fold by a process called "spallation", resulting in a shower of several trillions of neutrons each second.

(Spallation is a nuclear reaction in which the energy of each incident-particle is so high that more than two or three particles are ejected from the target nucleus and both its mass number and atomic number are changed.)

Under such intense irradiation by neutrons, thorium turns into uranium-233 (or U-233) which, according to Dr. M. Srinivasan, Head of BARC's Neutron Physics Division, "is the nuclear fuel of the 21st Century".

Named "Lotus", this experimental facility is e signalling of an era of "fissile-fuel factories", hich will convert the relatively useless thorium into a powerful fuel for nuclear reactors.

In a few years from now, the neutron accelerator will give way to a still more powerful neutron source—a thermo-nuclear fusion plant—capable of breeding much larger quantities of U-233 from thorium.

New route to nuclear fuel: According to Dr. Srinivasan, one of the designers of "Lotus", such fusion breeders will become available in 15 years, opening a new route to production of nuclear fuel from fertile thorium.

The ultimate idea, Dr. Srinivasan says, is to combine fusion breeder with conventional fission reactor, as in Rajasthan, into a "fusion-fission hybrid reactor" system.

In this system, U-233 will be produced in the fusion-breeder and, this, along with thorium, will be used as fuel in the conventional reactor to produce 'net electricity' after meeting the power demands of the in-house fusion plant.

A single fusion plant of 750 MW thermal capacity will produce enough U-233 to fuel 40 Rajasthan-type reactors, operating on thorium U-233 cycle, he said.

At the "Lotus" facility in Lausanne, BARC scientists are collecting data on the rate of U-233 breeding that will help them design powerful fissile-fuel factories in future.

Once the hybrid reactor concept becomes a reality, its impact on India's nuclear programme will be enormous, scientists say.

The hybrid reactors will advance by at least 20 years India's nuclear time-table because U-233 can be bred rightaway once fusion-neutron sources become available, it is said.

No worry about n-waste disposal: More importantly, India need not worry about nuclear waste disposal, because BARC has found that the reactors based on TH-U233 cycle produce very little long-lived 'actinide' wastes compared to the reactors using plutonium or uranium.

Speaking at the Sri Ram Institute for Industrial Research here recently, the BARC Director, Dr. P. K. Iyengar, visualised the hybrid reactor as one that "takes thorium in, and gives out electrical power, besides U-233, which can be used to build additional reactors".

Once the hybrid concept becomes feasible, he said, India need not build FBRs, which are the cornerstones of the current strategy

These potential advantages have forced BARC to look seriously into fusion-fission hybrid reactors, Dr. Srinivasan said.

Dr. Iyengar said it would only be "a small further step" to make Rajasthan-type reactors run on TH-U233 cycle. At present, the reactor is burning uranium.

A new technology: The fusion plant for breeding U-233 is, however a new technology, seriously pursued in the U.S., Britain, Japan and the USSR.

Considering the rapid developments in the area of hybrid reactors, India need not place too much emphasis on FBR, as "for the first time, we have a serious alternative to plutonium-fuelled breeders", Dr. Srinivasan said.

If India sticks to FBRs, it will be beyond the year 2040 when it will be able to tap energy from thorium, it is said.

Too long to become viable: The FBR, by definition, is a fast reactor that breeds fuel for starting another FBR. But BARC scientists have now found that it would take at least 30 years for one FBR to produce sufficient fuel for the next FBR, which is too long to make the nuclear programme viable.

In contrast, the 'doubling time' is very much less in a hybrid reactor whose another advantage is that the spent fuel can be dumped, saving the enormous cost of storage and reprocessing.

BARC scientists say India will continue with its current strategy for nuclear power until all aspects of the hybrid reactor are thoroughly studied.—PTI

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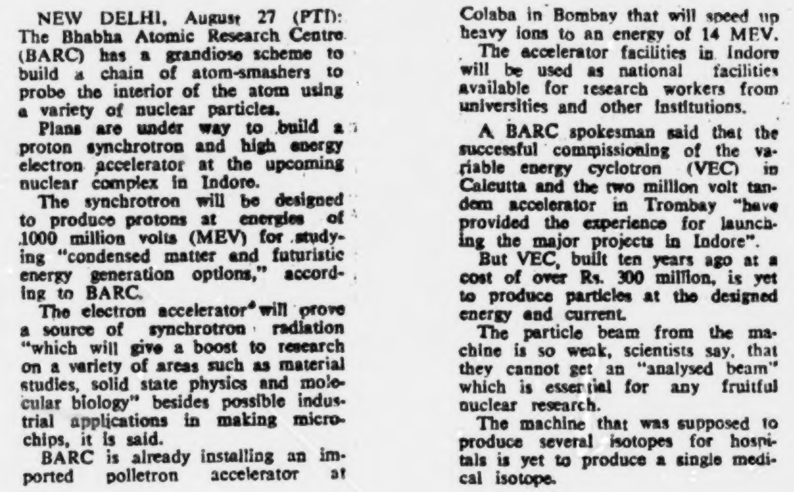
CSO: 5150/0010

BHABHA CENTER PLANS TO BUILD ATOM-SMASHERS TOLD

Bombay THE TIMES OF INDIA in English 28 Aug 86 p 7

[Text]



NEW DELHI, August 27 (PTI): The Bhabha Atomic Research Centre (BARC) has a grandiose scheme to build a chain of atom-smashers to probe the interior of the atom using a variety of nuclear particles.

Plans are under way to build a proton synchrotron and high energy electron accelerator at the upcoming nuclear complex in Indore.

The synchrotron will be designed to produce protons at energies of 1000 million volts (MEV) for studying "condensed matter and futuristic energy generation options," according to BARC.

The electron accelerator will prove a source of synchrotron radiation "which will give a boost to research on a variety of areas such as material studies, solid state physics and molecular biology" besides possible industrial applications in making microchips, it is said.

BARC is already installing an imported polletron accelerator at Colaba in Bombay that will speed up heavy ions to an energy of 14 MEV.

The accelerator facilities in Indore will be used as national facilities available for research workers from universities and other institutions.

A BARC spokesman said that the successful commissioning of the variable energy cyclotron (VEC) in Calcutta and the two million volt tandem accelerator in Trombay "have provided the experience for launching the major projects in Indore".

But VEC, built ten years ago at a cost of over Rs. 300 million, is yet to produce particles at the designed energy and current.

The particle beam from the machine is so weak, scientists say, that they cannot get an "analysed beam" which is essential for any fruitful nuclear research.

The machine that was supposed to produce several isotopes for hospitals is yet to produce a single medical isotope.

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CSO: 5150/0011

BRIEFS

DAE CLARIFICATION--In a clarification of the press report that the Department of Atomic Energy (DAE) has turned down a Soviet offer of nuclear reactors to India, the DAE said on Friday that "it has issued no such statement," report PTI. [Text] [New Delhi PATRIOT in English 23 Aug 86 p 3] /13046

POSSIBLE FUELS CONSIDERED--New Delhi, Aug. 19.--The Department of Atomic Energy (DAE) has proposed to fuel the Rajasthan power reactor with plutonium instead of only uranium in a major strategy that will overcome the restrictions imposed by a safeguards agreement with the Soviet Union, reports PTI. The reactors, RAPP-I and RAPP-II, are under the International Atomic Energy Agency (IAEA) safeguards since 1977 and India has been reprocessing their spent fuel at a huge cost to extract plutonium which has been accumulating without being put to any use. As the agreement with the Soviet Union forbids diversion of this plutonium to any other facility without IAEA concurrence, it has been proposed to burn this plutonium in RAPP-II itself along with thorium obtained from Kerala's beach sands. Thorium by itself is not a fissile fuel but, inside the reactor, it gets converted into Uranium-233 which will, along with plutonium, produce power. Apart from finding an outlet for the safeguarded plutonium, the DAE strategy will help conserve the scarce uranium which is currently used to fuel the RAPP reactors. The use of the plutonium within RAPP does not violate the agreement. [Text] [Calcutta THE STATESMAN in English 20 Aug 86 p 11] /13046

CSO: 5150/0017

AMROLLAHI URGES ATOMIC ENERGY FOR PEACEFUL PURPOSES

LD302328 Tehran IRNA in English 1648 GMT 30 Sep 86

[Text] Tehran, Sept 30, IRNA — The Islamic Republic of Iran would like to see developing countries be allowed to use atomic energy for peaceful purposes and for promoting their economic and industrial plans, said head of Iran's atomic energy organization Reza Amrollahi in Vienna Monday.

Speaking in the 30th session of the International Atomic Energy Agency (IAEA), Amrollahi said that Iran is strongly against the manufacture and stockpiling of nuclear weapons because of the danger they pose to mankind.

The Iranian official also said that it was obvious that true independent and non-aligned countries have not been allowed to make any progress in the area of nuclear technology and that their research in the field is very primitive. There is no limit on activities or expansion of nuclear arsenals by the superpowers and other countries which have the technology, Amrollahi said. He expressed hope that this "unjust" situation would not last long.

On the June, 1986 Iraqi raid on the Iranian atomic reactor in Bushehr, Amrollahi said that IAEA has so far not taken any deterrent measures against the attack and that the Baghdad regime has not stopped its violations of international regulations.

Amrollahi said that the IAEA seems to have implicitly encouraged the Iraqi regime to continue its destructive attacks by not taking a decisive stand.

The official also listed some of Iran's proposals on how to secure world peace and make the world free of nuclear weapons.

Representatives from nore than 100 countries are participating in the meeting which opened in Vienna Monday. The meeting will end on Friday.

/9274
CSO: 5100/4702

STEPS TAKEN AGAINST RADIATION LEAKS FROM NUCLEAR PLANTS

Muscat TIMES OF OMAN in English 11 Sep 86 p 2

[Text] Oman is planning to take measures against possible radiation leaks from nuclear plants abroad.

The Permanent Committee for Environment Protection from Nuclear Radiation held its first meeting on Tuesday at the Ministry of Environment and Water Resources.

The chairman of the committee, Under-Secretary for Environment Major-General Bakheit bin Said al Shanfari, referred to the Chernobyl nuclear accident and spoke on the necessity to take steps including monitoring radiation levels, developing warning systems and prevention of damage to life and the environment.

A technical committee constituted under the permanent Committee is to come up with a national emergency plan, according to an Environment Ministry source.

The Permanent Committee has been formed by Minister of Environment and Water Resources and Deputy Assistant to the Chairman of the Council for Conservation of Environment and Water Resources Sayyid Shabib bin Taimour, under the directives of His Majesty Sultan Qaboos.

Matters discussed by the committee on Tuesday included ways to promote cooperation in environment protection field with Swiss authorities.

This follows the discussions Sayyid Shabib had with scientists and officials of specialised organisations during his May tour of Denmark, Holland and Switzerland.

Holland and Switzerland have agreed to cooperate with Oman in its efforts to protect environment from possible nuclear fallout from abroad.

The technical committee formed will be headed by the Technical Affairs Director-General at the Ministry of Environment and Water Resources, and include officials from the following:

The Air Pollution Department, the Council for Conservation of Environment and Water Resources, Diwan of Royal Court Affairs, Musandam Development Committee, Regional Development Committee, the ROP, the Sultan Qaboos University, the Ministries of Agriculture and Fisheries, Electricity and Water, Communication, Interior and Defence.

The Permanent Committee meeting was attended on Tuesday by Under-Secretaries for Agriculture and Fisheries, Health and Communication, Hassan bin Abdulla al Morrazaa, Dr Salem bin Hamdan al Akhzami and Salem bin Ali bin Nassir al Siyabi, and the Director-General for Technical Affairs at the Ministry of Environment and Water Resources Said bin Salim al Shanfari.

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CSO: 5100/4503

PROVISIONS OF NUCLEAR AGREEMENT WITH PRC OUTLINED

Signed in Beijing

BK251225 Rawalpindi THE PAKISTAN TIMES in English 19 Sep 86 p 3

[By a staff reporter]

[Text] Islamabad, Sept 18 — The Pakistan-China agreement on peaceful use of nuclear energy signed in Beijing this week envisages cooperation in five important areas including design, construction, and operation of nuclear reactors for research and power.

Briefing newsmen about the agreement, a spokesman of the Ministry of Foreign Affairs said that it was the first formal agreement on the subject between the two countries. It specified the areas and forms of cooperation. The agreement was signed by Pakistan Foreign Minister, Sahabzada Yaqub Khan, and Mr Song Jian, Chairman of the State Commission for Science and Technology.

The spokesman said that the agreement also spelt out procedures for application of the safeguards of the International Atomic Energy Agency [IAEA]. There is also a special article in the agreement which lays down that cooperation in the atomic energy field would solely be for peaceful purposes and any equipment and material transferred from one side to the other shall not be used for military purpose. Further, IAEA safeguards would apply to such transfers.

The areas of cooperation between the two countries are:

— Production of radio isotopes and their use in industry;
— Application of radiation technology in agriculture;
— Cooperation in nuclear medicine and radio therapy;
— Exploration and exploitation of nuclear minerals, and;
— Design, construction and operation of nuclear reactors for research and power.

The forms of cooperation are:

— Exchange of scientific and technological information;
— Holding of symposia and seminars, and;
— Training of personnel and supply of material and equipment.

In reply to a question whether China will participate in the Chashma Nuclear Project, the spokesman said that it was only an enabling agreement and we have not concluded a deal for the manufacture of reactor, nor was it on the anvil [sentence as published]

Questioned further, the spokesman said that China does not produce nuclear reactors for export.

DAWN Terms Accord 'Major Step Forward'

BK251319 Karachi DAWN in English 19 Sep 86 p 15

[Editorial: "Sino-Pakistan Nuclear Accord"]

[Text] The Sino-Pakistan nuclear cooperation accord signed in Beijing on Monday is a development of far-reaching importance in the context of the relations between the two countries. By its very nature, the development, however, is bound to evoke conflicting reactions in international circles. Some will see it as a measure designed to promote bilateral cooperation between two friendly countries. Others, not so sympathetically disposed towards Pakistan, will be quick to decry it for its implications in the nuclear non- proliferation context. But seen against the background of the cordial relations between China and Pakistan, the agreement should be welcomed as a major step forward in bilateral cooperation, especially in the field of technology. Since 1976 when Islamabad and Beijing signed an agreement on cooperation in science and technology, the two sides have concluded seven protocols to promote technical collaboration in various areas, such as oil exploration, oceanography, industrial standards, and aquaculture. In pursuit of the process laid down by these arrangements, it is but logical that the two governments should have now decided to extend the scope of their cooperation to the peaceful use of nuclear power. Pakistan will, no doubt, be the major beneficiary. Although individually some of its nuclear scientists are of world renown, the Chinese have made far more impressive progress in research and development in the atomic field, training of nuclear scientists, and the manufacture of nuclear science systems. They have nine locally produced reactors operating in the country. Over 4,000 nuclear scientists are conducting research in China, and the country is today in a positin to build without any outside help a medium nuclear power station. Having reached the state where it can export nuclear reactors at competitive prices and share its know-how with other friendly countries, China should quite understandably wish to expand the scope of its cooperation with others. In fact, it took a step in this direction in early 1984 when it joined the IAEA. Later, it concluded nuclear cooperation agreements with Brazil, Japan, and the U.S. The accord between Islamabad and Beijing follows the same pattern.

What, however, needs to be noted about the agreement signed on Monday is that it provides fully for safeguards against the non-proliferation of nuclear weapons. The two parties have specifically emphasised that the accord is for peaceful purposes only and, as is standard practice now, they have incorporated in it the safeguards laid down by the IAEA to cover all material and equipment transferred under the agreement. Given the widespread use of nuclear technology for power generation and for other non-military purposes, the peaceful objectives of the Sino-Pakikstan agreement should evoke universal approval. But in view of the furor raised last year in the U.S. Congress and by the media in India and the West about the nature of Pakistan's nuclear programme and China's so-called role in it, one cannot rule out similar reactions to the present accord. If this happens, it will not be the first time that Beijing and Islamabad's credentials on this account have been questioned. China's nuclear cooperation agreement with the U.S. which was initialled in April 1984, met with strong congressional opposition on the alleged ground that China was helping Pakistan design a nuclear bomb. Of course, the allegation had been strongly denied. Yet the Western media kept on making insinuations against Pakistan and China. One only hopes that the performance would not be repeated all over again. There is much to establish Pakistan's and China's commitment to the peaceful use of nuclear technology under the agreement. That many of the doubts expressed last year in the context of non-proliferation were unfounded was evident by late 1985 when the U.S. Congress cleared the Sino-American nuclear accord. Moreover, Pakistan's willingness to sign the NPT [Nuclear Nonproliferation Treaty] on a reciprocal basis with India should help confirm its peaceful intentions in nuclear matters.

/9274
CSO: 5100/4700

COMMENTARY DEFENDS NUCLEAR AGREEMENT WITH PRC

BK270714 Karachi Domestic Service in English 1715 GMT 26 Sep 86

[Station commentary]

[Text] The prime minister of Pakistan, in a speech made in Azad Kashmir recently, reiterated that the agreement recently signed between Pakistan and China for cooperation in the nuclear field was exclusively designed for peaceful purposes. He said no other country, especially those in the region, should feel any apprehension in this regard.

The agreement has clearly mentioned that the material supplied by China to Pakistan for the purposes of research and development in nuclear technology would be governed by the safeguards laid down by the International Atomic Agency [name as heard]. An inspection of this shows incontrovertibly that no covert objectives are contemplated. It has been specifically mentioned that the cooperating nations will participate in the realm of development in the region of agriculture, medicine, and power, the areas in which Pakistan has already been conducting research and has already made some positive advances. But to make further progress in this sort of crucial research, it needed some valuable assistance.

Pakistan believes that nuclear technology for military purposes used by the Third World countries is a luxury, which they can ill afford. It has held that to build a nuclear arsenal would not only take much time to be of any use but is likely to promote an armaments race, which could not serve any useful purpose. It has always aligned itself with those countries who want the Indian Ocean region to be nuclear-free zone. The immense capital invested for the purpose can more suitably be utilized for raising the standard of living of the people. This is exactly what Pakistan is aiming at.

It was recently stated that the energy situation in Pakistan is very precarious. With the delays in the setting up of the power houses at the Port Qasim plant and in the completion of the hub [dam] project, there is certainty that Pakistan would be faced with considerable [power] load shedding in the year 1988 to 1992. And with the possible increase in demand, the need for heavier load shedding is likely to continue.

Nuclear power production is necesary to meet our demands. The agreement between Pakistan and China to cooperate is a link in the chain. It is most surprising that a country in the region continues to cry loud against possibilities which do not exist, while it itself has openly developed its military nuclear potential. The charge that Pakistan is making nuclear weapons has been refused [as heard] time and again from responsible quarters. Instead of accepting facts on their face value, they are being represented as a threat, even while the same party is building an arsenal of additional weapons — larger than any country in the whole of Asia. Mutual trust is the only ground on which positive pattern of peace can be built. Such a trust can only emerge out of admitting the reality as spelt out by either side. It is no service to peace to work for the breakdown of mutual respect by constantly hammering on a charge, which has been spelt out as having no legs to stand upon.

China has once again proved itself a real friend to Pakistan by agreeing to help it improve its potential in nuclear research and development for peaceful purposes. Even so for supressing any doubt, it has insisted on a type of safeguards which may be necessary and to which Pakistan has readily consented.

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CSO: 5100/4701

FRANCE EXPECTED TO HONOR ATOMIC PLANT DEAL

Lahore NAWA-I-WAQT in Urdu 29 Jul 86 p 4

[Editorial]

[Text] Changes in itinerary for the final stage of Prime Minister Mohammad Khan Junejo's recent trip abroad made on his arrival in Paris are expected to produce pleasing results. According to the original program, Prime Minister Junejo was to have an official meeting with French Prime Minister Jacques Chirac during his brief stopover in Paris. But the French Government transformed the arrival of the distinguished Pakistani visitor into a full-scale official visit, and so the Pakistani prime minister stayed in Paris for 2 days and a night. During his stay he had an official meeting with Chirac, and French President Mitterand also had a detailed meeting with Prime Minister Junejo. Pakistan has long had one major problem with France, and that is the impasse created in the supply of the atomic reprocessing plant. In this connection, a formal treaty was negotiated between France and Pakistan in March 1976 whereby France was to have supplied the desired plant to meet Pakistan's requirements. It is certain that before signing this treaty the French Government must have satisfied itself in every possible way that Pakistan would be using this plant for peaceful purposes and that it would never use it to join the nuclear weapons race. France had also obtained the necessary clearance from the International Atomic Energy Agency. It is a coincidence that France's current prime minister, Chirac, happened to hold the same post at the time the treaty was signed. But later the United States put pressure on France not to supply the desired plant to Pakistan. Proof of this pressure was revealed in the Tehran papers, then Secretary of State Henry Kissinger also admitted it. The current U.S. ambassador to Pakistan, Deane Hinton, also admitted that the United States put such pressure on France a number of times and that the French Government, yielding to this pressure, stopped the implementation of this treaty 2 years later, in 1978. Today, 10 years after the signing of the treaty, the desired plant still has not been supplied to Pakistan. The Jewish lobby played a big role in punishing Pakistan, and by spreading rumors about an "Islamic bomb" created concern that Pakistan with the help of this plant would start making nuclear weapons, which would be supplied to Libya or other Arab countries, thereby endangering the security of Israel in the Middle East. The Indian lobby was also very active against Pakistan in this campaign. India, which had already successfully exploded an atomic device, was not prepared to give this right to others.

The Indian intransigence was such that it not only refused to sign the nuclear nonproliferation treaty, but at the same time it would allow its nuclear installations to be inspected. In contrast, Pakistan's stand right from the beginning has been that it does not wish to make atomic bombs and that its atomic program is for peaceful purposes only. It is an irony of fate that Pakistan's stand has been rejected, and that all the thieves have gotten together and started crying thief. This is why during Prime Minister Junejo's formal discussions with President Reagan, as usual the host country expressed doubts and misgivings about Pakistan's atomic program, and according to the BBC, President Reagan warned Pakistan that if it were to make a nuclear bomb, all economic and military aid would be stopped. President Reagan also said that it was necessary to avoid a nuclear weapons race in South Asia. Prime Minister Junejo informed President Reagan that neither does Pakistan wish to make nuclear weapons nor does it have the ability to do so. In an interview carried on U.S. television, Prime Minister Junejo also stated in no uncertain terms that Pakistan does not have any intention of making nuclear bombs and that Pakistan's nuclear program is conducted solely for peaceful purposes. He added that Pakistan is facing an energy crisis and that in order to meet its ever increasing energy demand, it is trying hard to produce nuclear energy; in this way he tried to remove U.S. misgivings.

The Junejo-Chirac meeting took place in this atmosphere, and it is certain that the issue of supplying the atomic reprocessing plant was discussed. It is gratifying to note that Chirac has especially friendly feelings toward Pakistan. The treaty on supplying the plant was signed in 1976 during his term of office. He has said openly that France would not in any way try to withdraw from this treaty. Prime Minister Junejo, during a press conference on his return to Pakistan, said that discussions at the foreign minister level would take place between Pakistan and France on the question of the supply and installations of the atomic reprocessing plant. He said the French prime minister affirmed that the matter would be settled amicably, and he added that his talks with the French prime minister and the French president were very meaningful and successful. The fact that Pakistan is facing an energy crisis of great magnitude no longer needs explanation. During the last few years, he said, electrical load-shedding has become an everyday practice; he added that the cost of the difficulties the urban population is experiencing can be estimated, but the irretrievable loss suffered by the agricultural and industrial sectors is intolerable for the economy of a developing country like Pakistan. Because of the impasse in the supply of the reprocessing plant by France, Pakistan even today is lagging 10 years behind, while the rest of the world is at a new crossroads of development. Pakistan needs nuclear technology not only to meet its energy requirements but also for diagnosing diseases in hospitals, for protecting food, for protecting harvests from fatal diseases and germs, and for other scientific and research projects. With the return of Chirac to office it is hoped that, acting realistically, he will not only make the supply of the plant possible without further delay but that he will also provide Pakistan with an atomic reactor. Only in this way can the loss suffered by Pakistan since 1976 due to violation of the treaty on the supply of the atomic reprocessing plant be compensated. Pakistan has appealed to the International Court of Justice against this violation, and based on the hearings conducted so far, it appears that the proceedings in this case are in Pakistan's favor, which in turn is proof that Pakistan's stand is based on justice. In these circumstances, it is to be hoped that the French Government will take the necessary steps to implement the 1976 treaty in order to meet Pakistan's legitimate requirements and also to provide it with an atomic reactor. It is time for this to be carried out.

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CSO: 5100/4753

BRIEFS

NUCLEAR PLANT SITE SOUGHT--ESCOM [Electrical Supply Commission] head of marketing John Anderson says an investigation into a suitable site for a second nuclear power station is continuing, but a decision in this regard is not expected before 1991. Speaking at a meeting with the Southeastern Areas Development Association, Mr Anderson said 19 possible sites on the Cape's west, south and east coasts are being considered, but the survey would not consider areas east of Port Elizabeth. He said ESCOM's generating capacity was greater than present demands, but demand is expected to increase to such an extent that it will exceed supply by 20 percent in the year 2004. Also, ESCOM will have to expand in view of an expected coal shortage over the next 50 years; it is accepted that a second nuclear power station will have to be built. However, Mr Anderson emphasized that ESCOM is not planning on an operational station before the end of the century. [Text] [Johannesburg Domestic Service in Afrikaans 1400 GMT 25 Sep 86 MB] /9274

CSO: 5100/2

TAIWAN OBTAINS NUCLEAR TECHNOLOGY FROM U.S., MOSCOW CHARGES

OW/182025 Moscow Radio Peace and Progress in Mandarin to China 0300 GMT 18 Aug 86

[Station Observer Ivanov Commentary]

[Text] On 17 August 1982, the United States and China issued a joint communique on the Taiwan issue. Ivanov, an observer of this station, has the following comments on the event:

According to the joint communique, the United States will gradually reduce its arms sale to Taiwan. However, on the very day when the joint communique was made public, U.S. President Reagan pointed out in a speech: U.S. policy on continued arms sales to Taiwan has been unequivocally expounded in the communique, and is completely in conformity with the Taiwan Relations Act. Arms sales to Taiwan will continue in accordance with this Act.

Let me remind our listeners that the Taiwan Relations Act was signed by the U.S. President only 100 days after the United States and the People's Republic of China established diplomatic relations. In fact, the Act has fully preserved the military relations between Washington and Taipei. China has repeatedly expressed its serious opposition to the Act because it actually embodies the idea of two Chinas or one China and one Taiwan. Nevertheless, Washington has ignored all China's protests in this regard.

The United States is continuing to arm the Kuomintang reactionary clique in Taiwan. the United States constantly supplies the Taipei militarists with modern weapons. In addition, it has also given Taiwan the exclusive rights to make guided missiles, modern fighters, and other military equipment. The United States is appropriating funds and dispatching experts to Taiwan to set up military enterprises there, and is helping produce military equipment and weapons.

The foreign press has repeatedly reported that it was from the United States that Taiwan obtained the technology and raw materials to make nuclear weapons. It is reported that Taipei has made, or will soon make, nuclear weapons. It should be pointed out that the U.S.-Taiwan military relations completely conform to the Pentagon's strategic thinking and to Washington's militarist policy in the Asian-Pacific region. Since 1950, U.S. warlords have regarded Taiwan as their unsinkable aircraft carrier near China's coasts.

I would like to refer to the remarks by an advisor to the U.S. State Department at a recent news briefing before American and foreign journalists. He went so far as to say that U.S. military aid to Taipei is conducive to peace and stability in Asia.

Dear listeners, as you know, the U.S. imperialists' preparation for large-scale aggression in the Far East is described by their propaganda machine as a measure to insure security in Asia and counter the Soviet threat. In the eyes of the U.S. administration, U.S. Executive Order No. 59 is also for peace in Asia and in the world as a whole. That order lists more than 100 extremely important facilities in China as targets for U.S. nuclear strikes.

/12913
CSO: 4100/1

VATICAN EXPLAINS SUPPORT OF NUCLEAR ENERGY

AU170855 Rome ANSA in English 0845 GMT 17 Sep 86

[Text] (ANSA) Rome, September 16 — The Vatican came out Tuesday with a pro-nuclear energy stance, qualifying its support for nuclear power plants with the condition that they be limited in number and pose no threat to human life.

The stance was aired by Father Enrico di Rovasenda, the coordinator of the pontificia Academy's nuclear energy panel, in a interview published by Rome's *La Repubblica* daily.

The panel was assigned the task of probing the moral questions underlying nuclear energy and coming up with a "moral" response to the issue.

"I do not believe that you can issue an absolute 'yes' or an absolute 'no' with respect to peaceful nuclear energy", said the Dominican clergyman.

"It is unthinkable to suggest cancelling all the advantages that the great discovery of nuclear energy has brought", he added.

"The employment of nuclear energy for war objectives must be ruled out categorically", he concluded, "but it cannot be unconditionally ruled out with respect to be peaceful purposes".

The interviewer asked Father Di Rovasenda what stand the pontificia Academy may take with respect to the "nuclear issue".

He replied that the Academy will suggest building the fewest nuclear power plants possible, with the highest possible safety standards.

In the West's open societies, consumption may be reduced, he said, "but in the Third World, where there is dire need, nuclear energy could offer a solution to many problems as long as it is not installed as part of a colonization, or profit-marking, design...."

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CSO: 5100/2401

NUCLEAR DECISION IN 1988 EXPECTED

The Hague ANP NEWS BULLETIN in English 19 Sep 86 p 1

[Text] The Hague, 19 Sep--The Netherlands will decide in the spring of 1988 whether to go ahead with plans to build new nuclear power plants in the 1990's, Environment Minister Ed Nijpels said last night.

The government decided last year that new nuclear plants should be built to heop Dutch industry retain its competitive edge against businesses in neighbouring countries which have the advantage of cheap energy.

But the plans were suspended in the wake of the Chernobyl nuclear reactor disaster in April. The government said at the time it would not decide whether to put them into action until the causes of the Soviet accident were clear and had been evaluated.

Nijpels yesterday sent the second chamber of parliament a detailed programme of studies and measures which would be carried out before the final decision was made.

He said it could not be ruled out that the Netherlands would decide to abandon nuclear energy.

All the advantages and drawbacks were open to debate and serious arguments by environmental groups would be considered, he said.

Extensive studies would be held into the safety of nuclear plants, the lessons to be drawn from Chernobyl, and the long-term effects of nuclear accidents.

The minister estimated that damage caused by Chernobyl would cost the Netherlands several tens of millions of guilders. The costs this year would be 13.2 million guilders, and in 1987 some 6.6 million, he said.

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CSO: 5100/2403

LACK OF SAFEGUARDS AT NUCLEAR WASTE DUMP REPORTED

Madrid EL PAIS in Spanish 10 Sep 86 p 16

[Article by R Fraguas: "The CDS Has 'Proof' that French Trucks Frequent the Radioactive Waste Dump"]

[Text] Madrid--Tomas Martin Tamayo, provincial chairman of the Social Democratic Center (CDS) of Badajoz, reported to this daily yesterday that he has eyewitness and graphic proof about the recent and continued presence of heavy French Trucks in the District of Azuaga near the radioactive waste dump of El Cabril, in the Valdeinfierno coal mine and in Mina de la Oscuridad on the border zone between Cordoba and Badajoz. Spokesmen for the National Radioactive Waste Enterprise (ENRESA), owner of the installations, categorically denied these statements.

Martin Tamayo says that early on the morning of 12 June, a member of the CDS riding a trail bike [motorcycle] entered the zone surrounding the El Cabril nuclear waste dump. "The young man," adds the local CDS leader, "saw that large trucks with French license plates traveled along access roads to the installations of the nuclear waste dump." The same observation was repeated by the young motorcyclist the following morning. "Suddenly, his presence was discovered by the guards, who guard the installation equipped with radio transmitters. He was chased by them to the Padajoz town of Azuaga," adds Martin Tamayo.

Suspicions

The eyewitness report by the youth, repeated to the local leadership of his party, have served Tomas Martin Tamayo, provincial chairman of the CDS, in arguing his suspicions on the alleged transfer to El Cabril of radioactive waste coming from France.

Martin Tamayo said that he does not state that the presence of the French trucks necessarily means the transfer of French radioactive wastes there, although he said that "the citizens of the Azuaga district of Padajoz have the right ot receive information on what is happening there." Martin Tamayo also said that he has many reports from residents of the district to confirm his statements.

Sources of the ENRESA company, owner of the installations of El Cabril, categorically deny the statements by Martin Tamayo. "There has never been even the smallest amount of nuclear waste from France, nor trucks with plates from that country, nor anything like that.

"That information is false from beginning to end. They never made a trip of any kind of that nature. Only wastes of low and medium radioactivity of Spanish origins are stored in El Cabril under the supervision of the Nuclear Safety Council and with the knowledge of the Andalucia Board. There are no Civil Guards guarding any installation. The establishment, located in the municipal limits of Hornachuelo, may be visited," said a spokesman of the company in an unsigned note.

Other sources reported that "it is impossible that nuclear wastes from France are returned to Spain, since the only ones that are sent to France for reprocessing are those from the nuclear powerplant of Vandellos I, of which none have been returned to our country up to now."

Low Activity

In any case, they add, because they are highly active wastes, generally irradiated fuel, they would never be sent to El Cabril, which only stores low and medium activity radioactive wastes.

ENRESA sources reported that the El Cabril installations contain some 10,000 drums of radioactive waste material. The nuclear waste dump was inaugurated in 1961, and up until 1985 it belonged to the Nuclear Energy Board. Recently, its highway accesses have been reconditioned, as have the modules for the storage of the sealed drums which contain the waste.

8908
CSO: 5100/2577

DESIGN DEFECTS DISCOVERED IN ASCO POWERPLANTS

Madrid EL PAIS in Spanish 9 Sep 86 p 13

[Article by Lola Lara: "Investigations on Malfunctions in Asco Discover Design Defects in the Two Nuclear Powerplants"]

[Text] Asco--The original design of the two Asco nuclear powerplants show defects, made evident as a result of the investigations initiated for finding the origin of the last malfunctions by Group 2, according to the explanation of Nuclear Safety Council (CSN) Inspector Javier Zarzuela. The director of the powerplant, Ignasi Camps, yesterday confirmed that these supposed design errors are being investigated and that they refer to an error in the calculation of maximum temperatures that the activating mechanism of the main steam check valves can withstand and still function properly.

In a meeting held with the media last Saturday, Javier Zarzuela said that the first investigations made in Asco 2 as a result of the failure of one of the safety systems (the one consisting of the steam check valves) point to the convergence of three factors as being the last causes of the irregularity discovered: dirty oil and excessive pressure in their circuits and overheating of the valve activating mechanism. With respect to this last factor, he said that while the manufacturing company, the U.S. company, Monroe, indicates that this mechanism can operate correctly at a temperature of up to 41 degrees centigrade, subsequent tests determined that during summer months temperatures of over 50 degrees centigrade existed in the powerplant.

According to Ignasi Camps, this would be the design defect to which Zarzuela referred in a meeting with the 13 mayors of the Asco nuclear area. As far as Camps is concerned, the origin of the defect would be the existence of a microclimate in the zone of the siting of the powerplants, which would allow reaching temperatures higher than those estimated initially. This would have led to an error in the establishment of play (spaces left between the meshing of some parts so that they can move properly and which are directly related to the temperatures to which they are going to be subjected) in the mechanism for activating the valves.

The problem, in the opinion of Ignasi Camps, does not require a complicated solution, since it could be solved simply by changing the oil. However, he does not categorically discard the possibility that the CSN will order the replacement of this mechanism, up to now a servomotor made by the American company, Monroe, with another one which could very well come from the same manufacturer.

New Delay

If this error in the calculation of temperatures is verified, the incident would affect group 1, since its design is identical to that of Asco 2. This Group has been shut down since last 4 July for the replacement of one-third of the uranium and its new startup date was scheduled for the second half of this month. However, it cannot be discarded that it will undergo a delay if the CSN confirms the existence of this design defect, because even though it has been said that the technical solution would not be complicated, it would bring with it a series of bureaucratic transactions (import permits, problems of supply...) which could keep both powerplants shut down for more time than initially foreseen.

As for the other irregularities detected in Asco 2, which remains shut down since last 23 August as a result of the failure in the steam valves--those referring to dirty oil and excessive pressure in their circuits--the resident CSN inspector in Asco already said last Saturday that the solution is simple. It would be enough to insert additional filters, which will prevent the contamination of the oil, and to insure correct regulation of the pressure of the oil.

However, the possibility that some human error by workers or technicians of the powerplant existed, specifically in the handling of the oil which may have allowed the entry of dust particles, is being studied by the CSN, which does not discard the imposition of penalties on the user electric companies; penalties which could be the maximum if the existence of human error is confirmed.

Despite the fact that it is a holiday in Madrid, a CSN commission yesterday received the technicians of Asco 2 in morning and afternoon sessions to have a joint discussion of the report prepared by the powerplant, which subsequently should be submitted to the plenary meeting of the agency together with that prepared by the CSN.

Elsewhere, the green Greenpeace bus arrived in Tarragona yesterday. In a press conference, its spokesman in Spain, Jordi Bigas, criticized the permit that the CSN granted Asco 2 for going into operation after a failure in the steam check valves was discovered for the first time last 1 July, a failure that was repeated last 23 August.

8908
CSO: 5100/2577

NUCLEAR ENERGY SAFETY ISSUE REVIVED FOLLOWING CHERNOBYL

Stockholm DAGENS NYHETER in Swedish 31 Aug 86 p 12

[Article by Ake Ekdahl]

[Text] It is a deeply divided Energy Council that will present a report this fall on which the government and Energy Minister Birgitta Dahl must base their decision on nuclear power. Special interests and old political ties are determining the conclusions that are being drawn with regard to the future of nuclear power after Chernobyl.

Once again, the parties in parliament must find some alternative by the end of this year that can gain the support of a majority as well as provide the highest possible level of safety. The positions are the same as before: the Center Party and VPK (Left Party Communists) want a more precise formulation of the government's strategy to phase out nuclear power. The Social Democrats and the Liberal Party want to phase out nuclear power as rapidly as possible, without endangering important environmental goals and employment levels. In both cases, there is great interest in examining safety conditions at the Barseback plant. The Conservatives want to continue using nuclear power throughout the lifetime of the nuclear plants.

So far, the government's strategy has been to decide which alternative sources of energy should be prioritized when nuclear power is discussed during the party congress of 1990 and to develop a plan by 1995 for phasing out nuclear power. The Chernobyl incident does not appear to have changed this schedule.

The Energy Council will meet on Tuesday without having come any closer to accomplishing its task of evaluating the consequences of Chernobyl for Sweden and the consequences of phasing out nuclear power in Sweden more quickly. The council is waiting and hoping for a miracle from its group of experts. This group will meet once again on 6 October and by 4-5 November the council is to have reached a decision. After that time, the government will meet with the opposition parties in parliament to discuss energy policy.

Gigantic Network

Behind the Energy Council and its group of experts, who must now make the scientific assessments, there is a gigantic nuclear power establishment. It spans the entire society. There are political coalitions, municipalities, cooperatives, organizations, authorities, businesses, researchers--all representing substantial economic interests, both public and private.

The nuclear power establishment in Sweden can be compared to a gigantic molecule with numerous bonds in many directions. Key figures such as Carl-Erik Nyqvist, director general of the State Power Board, belong to a number of different boards, study groups, and management organizations. For example, who did not get to know Gunnar Bengtsson of SSI (National Institute of Radiation Protection) last summer--the man with the pleasant accent? What is SSI? The answer to this question and explanations of several other abbreviations used in the nuclear power debate are presented below.

Political Organs

The political organs are at the top of the hierarchy. This includes the municipalities and local zoning boards, but also environmental organizations and a large number of study groups, more or less permanent, that examine energy issues. Perhaps the International Atomic Energy Agency (IAEA) in Vienna, under the Swede Hans Blix, should also be mentioned here.

Parliament: Energy policy guidelines were established by a parliamentary resolution in the spring of 1985. The main reference points for the phasing out of nuclear power are 1990, when parliament must come up with a plan for alternative energy sources, and 1995, when parliament must have a plan and legislation for eliminating nuclear power. In parliament, the Social Democrats and the Liberal Party support the decision to phase out nuclear power by the year 2010. The Center Party and the Communists want to proceed more rapidly. The Conservatives do not want to be tied to any particular date.

The government: The cabinet member who is responsible for nuclear power is Energy Minister Birgitta Dahl. She is a minister without portfolio under Industry Minister Thage G. Peterson.

The Energy Council: It was appointed by the government as a consulting group for the upcoming elimination of nuclear power. All the parties in parliament are represented. The council also includes representatives from business, the power industry, researchers, organized labor, the municipalities, and environmental movements. Energy Minister Birgitta Dahl is the chairman. After the accident at Chernobyl, the council was given the additional task of studying its consequences on Swedish nuclear power. A special group of experts was appointed, under the leadership of county governor Gote Svensson.

Monitoring

Nowhere else in the world is nuclear power safety so extensive and well organized as it is in Sweden. An extensive monitoring apparatus makes sure the regulations are followed. From time to time, these organizations have changed names and assignments. In addition to the county government, the Environmental Protection Board, and the Franchise Board for Environmental Protection, special mention may be made of the following.

SSI: The National Institute of Radiation Protection is the supervisory authority for protection against dangerous radiation. SSI establishes maximum permissible values for radiation doses. SSI is a part of the Agriculture Ministry. The government appoints the board. There are representatives from organized labor, public interest groups, occupational safety organizations, environmentalists, and the Social Welfare Board. The SSI chief is Gunnar Bengtsson.

SKI: The Nuclear Power Inspection Board is the supervisory authority that monitors operation of nuclear power generation to see that the regulations are followed. It is part of the Energy Ministry. The board is appointed by the government. The SKI chief is Olof Hormander.

SKN: The State Nuclear Fuel Board monitors the handling of spent nuclear fuel by the power companies and it is the responsible authority for the phasing out of nuclear power. It is responsible for supplying information to the general public on waste and on the elimination of nuclear power. The board is under the leadership of Gerhard Ronnkvist. The board is appointed by the government.

The Energy Authority: Since 1983 it has been the central administrative authority for the energy supply. It is charged with working for the effective use of energy and dealing with safety questions. It is under the leadership of Hans Rode.

SRV: The State Rescue Service was established on 1 July of this year. It is the main authority in charge of rescue work in the event of a nuclear accident. Its main tasks are providing information and training. Its leader is Lennart Myhlback.

Research Needed

Reactor safety, waste treatment, and solutions to the problem of long-term storage of radioactive waste in the future require significant resources for research.

SKB: Svensk karnbranslehantering AB is owned by the State Power Board and the other three nuclear power companies. It is the task of SKB to develop, plan, construct, and operate facilities for spent nuclear fuel from the 12 Swedish nuclear power plants. It also deals with the uranium supply. A facility for the intermediate storage of spent nuclear fuel (30-40 years) has been constructed in Oskarshamn (Clab). There is a special vessel, the Sigyn, for the transport of spent fuel. SFR is a final storage facility for low and medium level radioactive waste from the nuclear power plants. It is a repository under 50 meters of rock beneath the seabed near Aland. It will be complete by 1988.

RKS: The Nuclear Power Safety Board is an organization formed by the nuclear power producers to gather information on Swedish accidents at nuclear power facilities. It does extensive work on the international level.

Studsvik: The company has 1,100 employees and sells systems and services in the energy field. It is envolved in high-technology research and production. In Studsvik, south of Stockholm, there are major nuclear technology resources, including a reactor for fuel samples. Studsvik has a special training center for nuclear power personnel, AB Karnkraftsutbildning (AKU). Extensive research is underway on storage in rock at the old Stripa Mine at a depth of 360 meters.

SGAB: Sveriges Geologiska AB is a state-owned company, under the authority of the Industry Ministry, which has taken over consulting work previously done by the old SGU, Swedish Geological Surveys. SGU prospected for uranium, while SGAB is prospecting for solid rock to serve as a final storage facility for nuclear waste.

Several Owners

All this monitoring and research revolves around four power producers, the owners of the various nuclear power plants with a total of 12 units. The state, which is the ultimate monitoring agent for this activity, is also the predominant owner. The municipalities are also important part-owners. Private ownership interests are most important at Oskarshamn and Barseback. The power producers have a joint organization called Kraftsam.

The State Power Board: This is a state-run business with 11,000 employees. It is the largest power company and provides almost half the country's electricity. Half the electric power is generated by nuclear plants. The State Power Board is the sole owner of the four reactors at Ringhals and has a strong interest in Forsmark.

Sydkraft: This is Sweden's largest power producer after the state-owned State Power Board. It generates electricity primarily from nuclear power, but also from hydroelectric power, coal, and oil. Sydkraft is the sole owner of the two nuclear power plants in Barseback and owns 46 percent of the plant at Oskarshamn. Sydkraft is owned by municipal and private interests.

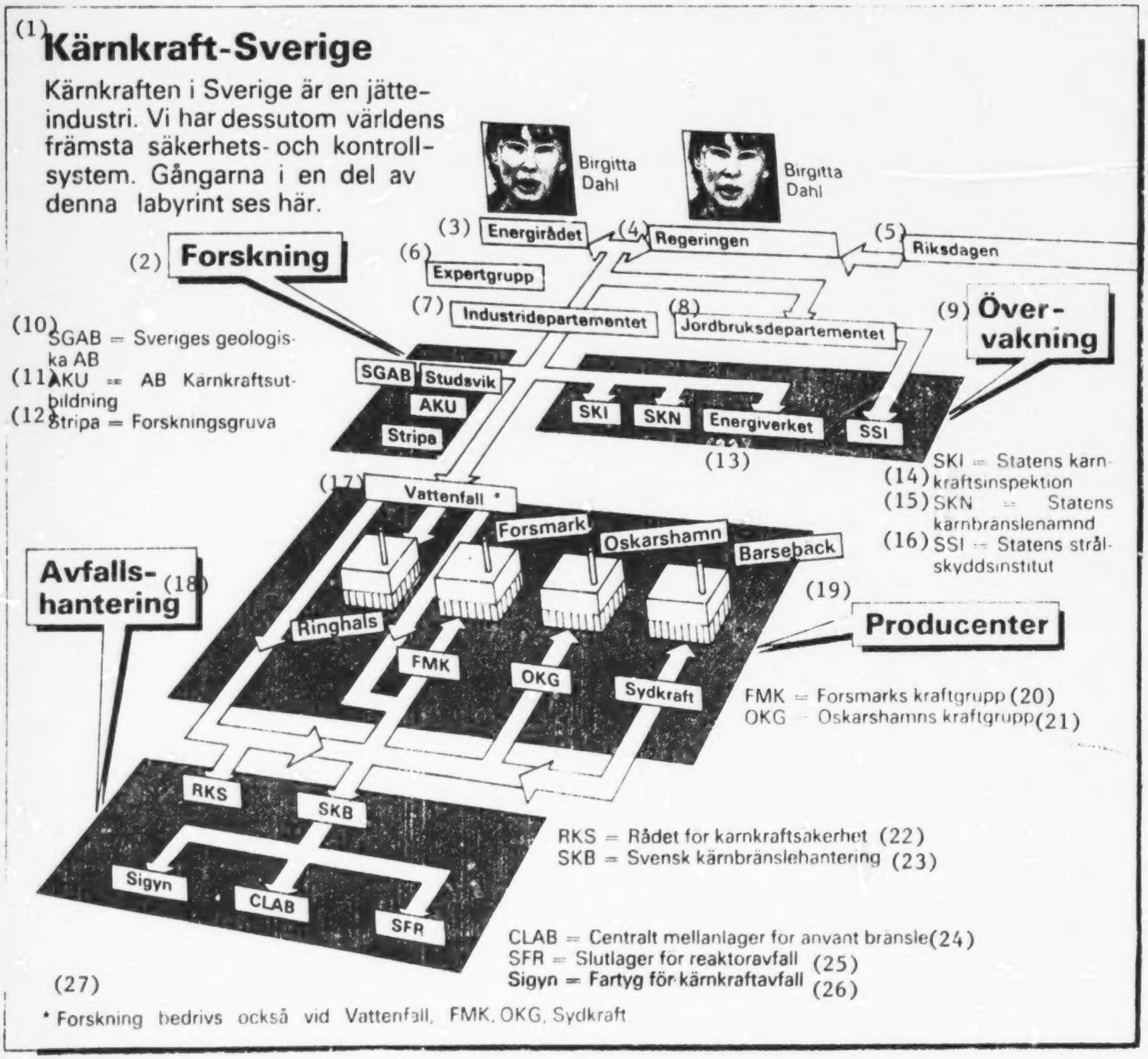
OKG (Oskarshamns Kraftgrupp): This company has constructed and is operating three nuclear power plants in Oskarshamn. Eight municipal and private power companies are part-owners. The municipal ownership is predominant, in that Sydkraft, Stockholmenergi, and Gullspangs Kraft own 62 percent. Other owners are AB Skandinaviska Elverg, Stora Kraft, Varmlandskraft, Krangede, and Balforsens Kraft AB.

FMK: Forsmarks Kraftgrupp, with municipal (Stockholm) and private interests, owns 75 percent of the three nuclear power plants. The State Power Board and Mellansvensk Kraftgrupp own the rest.

Private Interests

In recent years, the participation of private interests in nuclear power production has been reduced by political decisions. Some private participation continues in the form of maintenance and operation of nuclear power plants. This includes Asea-Atom, a semistate-owned manufacturer of nuclear power plants and fuel. Asea-Atom is now the only company outside the United States and the Soviet Union that can deliver complete nuclear plants.

Other companies listed on the stock exchange are state-owned Uddcomb, which has manufactured reactor vessels and steam generators, the Wallenberg-owned Asea Stal AB which manufactures turbines, Sandvik Steel which is a Skanska company, Avesta AB of the Johnson Concern, ABV which is one of the largest construction companies in Europe, what remains of Nohab Verkstads AB, and finally AB Kollin & Strom, which is involved in maintenance at all Swedish nuclear power plants.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(2) Forskning
(6) Expertgrupp
(7) Industridepartementet
(8) Jordbruksdepartementet
(9) Över-vakning
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Barsebäck
Ringhals
Avfalls-hantering (18)
(19) Producenter
FMK
OKG
Sydkraft
RKS
SKB
Sigyn
CLAB
SFR

(1) **Kärnkraft-Sverige**

Kärnkraften i Sverige är en jätteindustri. Vi har dessutom världens främsta säkerhets- och kontrollsystem. Gångarna i en del av denna labyrint ses här.

(10) SGAB = Sveriges geologiska AB
(11) AKU = AB Kärnkraftsutbildning
(12) Stripa = Forskningsgruva

(14) SKI = Statens kärnkraftsinspektion
(15) SKN = Statens kärnbränslenämnd
(16) SSI = Statens strålskyddsinstitut

FMK = Forsmarks kraftgrupp (20)
OKG = Oskarshamns kraftgrupp (21)

RKS = Rådet för kärnkraftsäkerhet (22)
SKB = Svensk kärnbränslehantering (23)

CLAB = Centralt mellanlager för använt bränsle (24)
SFR = Slutlager för reaktoravfall (25)
Sigyn = Fartyg för kärnkraftavfall (26)

(27)

* Forskning bedrivs också vid Vattenfall, FMK, OKG, Sydkraft

Key to figure:

1. Nuclear Power in Sweden: Nuclear power in Sweden is an enormous industry. In addition, we have the most outstanding safety and monitoring system in the world. Part of this labyrinth is shown in the figure.
2. Research
3. Energy Council
4. Government
5. Parliament
6. Group of Experts
7. Industry Ministry
8. Agriculture Ministry
9. Monitoring
10. SGAB: Sveriges geologiska AB
11. AKU: AB Karnkraftsutbildning
12. Stripa: Research Mine
13. Energy Authority
14. SKI: Nuclear Power Inspection Board
15. SKN: State Nuclear Fuel Board
16. SSI: National Institute of Radiation Protection
17. State Power Board
18. Waste Treatment
19. Producers
20. FMK: Forsmarks Kraftgrupp
21. OKG: Oskarshamns Kraftgrupp
22. RKS: Nuclear Power Safety Board
23. SKB: Svensk Karnbranslehantering AB
24. CLAB: Central Intermediate Storage for Spent Fuel
25. SFR: Final Storage for Reactor Waste
26. Sigyn: Ship for transport of nuclear waste
27. *Research is also conducted at the State Power Board, FMK, OKG, and Sydkraft

9336
CSO: 5100/2572

BRIEFS

NUCLEAR FUEL TO FRG--Asea-Atom has landed a large German order for nuclear fuel. This order amounts to about 200 million kronor. The company will deliver 350 fuel assemblies, so-called Svea-fuel, to the Brunsbuttel Nuclear Power Plant west of Hamburg. The nuclear power plant is operated by Hamburgische Elektrizitats Werke AG. [Text] [Stockholm DAGENS NYHETER in Swedish 30 Aug 86 p 14] 9336

CSO: 5100/2572 END

JPRS-TND-86-024

3 NOVEMBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

FBIS FOREIGN BROADCAST INFORMATION SERVICE

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Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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JPRS-TND-86-024

3 NOVEMBER 1986

WORLDWIDE REPORT

NUCLEAR DEVELOPMENT AND PROLIFERATION

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HONG KONG

DUTCH DAIRY PRODUCTS RADIOACTIVITY AT 'SAFE LEVEL'

Hong Kong HONGKONG STANDARD in English 23 Sep 86 p 2

[Text] DUTCH dairy products sold in Hongkong contain only harmless levels of radioactivity resulting from the Chernobyl nuclear disaster, according to a member of the Dutch Ministry of Agriculture and Fisheries.

Dr Alfred Feberwee spoke in Hongkong yesterday as part of a Far Eastern tour aimed at convincing importers of Dutch food that levels of radioactivity are well below internationally accepted safety standards.

The tour followed a decision by the Philippine Government earlier this month to ban the products because of fear over high radioactivity levels.

The European Economic Community (EEC) agreed on June 1 to impose a radioactivity safety limit of 370 units per litre for liquids and 600 units per kilogram for solid food.

Dr Feberwee said milk produced now in Holland is contaminated with about five units per litre of radioactive cesium.

"So we are well below the EEC limit," Dr Feberwee said.

However, he acknowledged that radioactive levels just after the Chernobyl disaster in early May were much higher.

"Initially we were faced with the problem of radioactive iodine which has a half-life decay rate of eight days," he said.

He explained that this meant the intensity of the radioactivity diminished by 50 percent every week or so and therefore posed only a short-term problem.

"All our milk was screened and any batch that was found to contain more than 500 (units per litre) was discarded," he said, adding that this more highly contaminated milk would only have reached Hongkong if it had been flown to the territory.

"As it is, all our milk is transported here by sea, so the (radioactive) iodine would have decayed by the time it got here," he said.

It had been reported earlier that levels of the substance in certain areas of Holland were as high as 250,000 units per square metre.

While radioactive cesium-137 did not appear in large quantities in the fall-out from the disaster, it is now almost the only traceable radioactive substance to be found in Holland due to its much longer 30-year half-life.

During his short stay in Hongkong Dr Feberwee also met Dr Ron Perry, the Government Hygiene Adviser, and officals of the Consumer Council.

He flies on to Taipei today.

/12379
CSO: 5150/0024

HONG KONG

PRC VISITOR SAYS IAEA TO INSPECT DAYA BAY PLANT

Hong Kong HONGKONG STANDARD in English 16 Sep 86 p 3

[Article by Yau Shing-mu]

[Text] CHINA will throw open the door of the Daya Bay nuclear plant for inspection by the International Atomic Energy Agency, as the power station will have little military value.

This was recently disclosed by the chief engineer of Fast Breeder Reactors at Beijing's Ministry of Nuclear Industry, Mr Xu Mi, who, with other members of the China Nuclear Society, is in Hongkong for the current Nuclear Technology Exhibition.

Two factors have underscored China's decision to allow IAEA safeguards to be implemented and inspected at Daya Bay: the Chernobyl incident and the local uproar over the safety of the nearby nuclear plant.

Though China has been a member of the Vienna-based United Nations-affiliated organisation for two years, it objected to the safeguards as an undue intrusion on its sovereignty until last month.

The IAEA has developed a programme of on-site inspections, audits, and inventory controls, known collectively as "safeguards" which are widely regarded primarily as a bulwark against the spread of nuclear arms.

Mr Xu told *The Standard* the reactors usually employed for producing weapons-grade plutonium (Pu-239) are different from the pressurised water reactors like the one to be installed at Daya Bay.

China's second nuclear bomb was made of Pu-239.

If China were to use the Daya Bay plant to produce Pu-239, it would cost quite a lot and defeat the economic purpose of the plant, he said.

After slow consumption of nuclear fuel, rather than the fast reaction in Pu-239 producing process, the plant will produce plutonium-240 and a series of other radioactive isotopes.

Some of them will be extracted for other uses but, Mr Xu said, they would have little military value.

"Thus, we accepted the IAEA to apply safeguards to the Daya Bay plant. It is the only nuclear project in China under the IAEA safeguard application," Mr Xu said.

He said, however, China has already developed a whole system of nuclear weapon technology and production lines.

He said China has more than 10 reactors but he declined to divulge further. He said the exact number and location of other reactors are national security-classified information.

What he could tell was that there are four institutes at where nuclear research is being conducted. Two are in Beijing: the Institute of Atomic Energy and at Qinghua University; the third in Shanghai and the fourth in Sichuan.

Moreover, he said China has its own uranium-enrichment facilities capable of meeting the needs of atomic bomb manufacturing. But he declined to reveal their capacities and locations.

/12379
CSO: 5150/0026

IAEA AGREEMENT ON NOTIFICATION BENEFITS HONG KONG

Hong Kong HONGKONG STANDARD in English 29 Sep 86 p 1

[Text] HONGKONG will benefit from a recent 50-country agreement on procedures following a nuclear accident, a senior Government official said yesterday.

In a special session of the International Atomic Energy Agency (IAEA) held last week, more than 50 countries — including China and Britain — agreed to immediately notify and assist each other in the event of a nuclear accident.

Although Hongkong is not a member of the international body, which only accepts sovereign states as members, the agreement will be beneficial to the territory, said Mrs Emmeline Mok, Principal Assistant Secretary for Economic Services.

Her comments followed her return from the conference in Vienna where she was sent by the Government as an observer under the British delegation.

Mrs Mok said she was impressed by the willingness of the attending countries to participate in the agreement signed during the session held from September 24 to 26.

Her trip cemented valuable contacts between the Government and the IAEA, she said.

The IAEA's session was called in response to the Chernobyl disaster in the Soviet Union earlier this year and was attended by about 700 delegates from as many as 60 countries.

/12379
CSO: 5150/0031

BRITISH ATTITUDE TOWARD DAYA BAY PROJECT STUDIED

Thatcher Remarks to Youde

Hong Kong HONGKONG STANDARD in English 11 Sep 86 p 1

[Article by Sheila Dawes]

[Text] **THE British Government has conveyed to Beijing the concerns of the Hongkong people over the Daya Bay nuclear plant project on "several occasions", Prime Minister Margaret Thatcher revealed in a press statement yesterday.**

Mrs Thatcher made the remarks after an hour-long meeting with the Governor, Sir Edward Youde, and his six-member delegation at her official residence at 10, Downing Street.

Mrs Thatcher reassured Sir Edward and his delegation that the Chinese government would make "every effort" to "ensure that the...construction, operation and management of the plant would be carried out to the highest possible safety standards."

Despite the outward show of confidence, it is believed that British ministers feel that the Hongkong Government has a major public relations task on its hands in calming local anxieties over the project, which is to be located some 50 km from Hongkong.

Some have even gone to the extent of speculating that current sentiment against the $27-billion project may be even more damaging to the morale and confidence of Hongkong than the anxieties created just before the announcement of the Sino-British Joint Declaration two years ago in which London agreed to have Hongkong revert to Chinese rule in 1997.

Sir Edward and his delegation are in London to brief Mrs Thatcher and her top government officials over a range of issues involving Hongkong.

His delegation includes Sir Michael Sandberg, Senior Umelco member Miss Lydia Dunn, Mr Chen Shou-lum, Miss Maria Tam, Mr Allen Lee and Mr Oswald Cheung.

All six are members of the Executive Council, popularly dubbed the "Governor's Cabinet."

Miss Tam and Mr Lee, who led separate Legislative Council nuclear fact-finding missions abroad following public uproar over the project, are due to visit Beijing on September 18 for discussions with top Chinese officials.

In what has been considered as a shrewd public relations move, China invited 11 members of the fact-finding missions for a three-day visit to discuss their report on the missions.

Although Daya Bay was the fifth item on Mrs Thatcher's press statement yesterday, it is believed to have taken up the lion's share of the meeting.

Sir Edward is also understood to have spent much of Tuesday's meeting with the Minister of State for the Foreign and Commonwealth Office, Mr Timothy Renton, discussing the Daya Bay issue.

Mrs Thatcher also touched on the review of representative government in Hongkong next year by reaffirming Britain's commitment to it and confirmed that "full account would be taken of the views of the people of Hongkong when drawing conclusions from the review."

The statement referred to the progress achieved in implementing the Joint Declaration over the 15 months since the accord came into effect.

Interview with 'Official Sources'

Hong Kong SOUTH CHINA MORNING POST in English 12 Sep 86 p 1

[Article by John Beasant]

[Text] A MAJOR accident at the Daya Bay nuclear plant Hongkong is a real though exceedingly remote possibility – but if it did happen, it would be impossible to evacuate Hongkong's six million people.

An exclusive interview in Britain yesterday with highly-placed sources close to the United Kingdom Atomic Energy Authority at Harwell revealed that any plan to evacuate Hongkong's residents would be "beyond comprehension" and "logistically impossible."

But the sources told the *South China Morning Post* that an evacuation plan was politically and socially essential, following the Chernobyl accident and an upsurge in public concern over Daya Bay.

The *Post* was granted the interview after the release of a top-level Government report to *Post* reporters last week.

The report revealed the Hongkong Government had failed to set up a co-ordinated science and technology team here, after the contract of its science adviser, Dr John Wright, ran out in June 1984.

Several Government officials admitted last week the Government still did not have a science and technology adviser and there was no head scientist in Hongkong to co-ordinate information on Daya Bay.

The science and technology team, according to a local source, would have provided top-ranking scientific information on Daya Bay to the Government and Harwell and it would have stymied Government and public criticism of the Harwell reports.

Reaction

In yesterday's interview, the British sources claimed:

- The Hongkong administration's criticism of the Harwell report was "the reaction of a Government under pressure."
- The Hongkong Government was "not informed" and "has not worked in such areas" of high technology before.
- The sources said "there were constraints set by the terms of the contract with the Government of Hongkong, time that could be spent being one of them, which of course the overall cost would reflect."
- The Hongkong Government and the public were initially unconcerned about the Daya Bay project but the Government attitude changed dramatically after the Chernobyl accident.

"The change in public concern, after the accident at Chernobyl, made it necessary for the Government of Hongkong to do more to accommodate this upsurge in public alarm over the Daya Bay complex," they said.

"This was reflected in the need for Harwell to assess as best it could the possible damage that would be sustained by Hongkong in the event of an accident at Daya Bay.

"This part of the relevant report, while being highly classified, was definitely leaked.

"It was soon apparent, for example, that the Hongkong Observatory had a copy within days."

The sources said that in 1984, the AERE (Atomic Energy) Harwell was approached by the Government of Hongkong which was seeking advice and guidance on preparing itself for living with Daya Bay.

It was stressed that no widespread public concern existed in Hongkong itself, but that the Government did want to reinforce the scientific and technical advice available to it.

It needed assistance also in training those members of its scientific staff it would later identify – a small number – who would eventually be responsible for operating a radiological protection system for the territory.

"There was of course, a dramatic change in public concern worldwide post-Chernobyl," said the sources.

Constraints

"The advice that was tendered in the reports prepared by Harwell for the Government, of which there are several, was written by experts in their particular fields.

"There were constraints set by the terms of the contract with the Government of Hongkong, time that could be spent being one of them, which of course the overall cost would reflect."

The report has two phases:

Phase one defined a preliminary assessment of the effects on Hongkong of an accident at Daya Bay.

Phase two, which has yet to start, will be more comprehensive and based on more detailed information, to be supplied to Harwell by the Hongkong Government.

Asked about comments in Hongkong that the reports lacked depth, one source said that "with the greatest of respect, Hongkong is not an informed customer of ours. It has not worked in such areas before. Nuclear power is a high technology matter, relatively of an unknown quantity in Hongkong Government circles.

"Their criticism of the report is, in my opinion, the reaction of Government under pressure."

The source said the phase one report did exactly what it set out to do, and represented an honest scientific appraisal.

"The possibility of an accident occurring at Daya Bay, such as took place at Chernobyl, is exceedingly remote.

"It must be stressed that the safety standards at Chernobyl were far from satisfactory – they were not good at all."

The sources said that in the event of a major accident at Daya Bay, the Chinese authorities would have to evacuate people from within a 10 km radius of the plant.

Although Hongkong was 50 km from Daya Bay, the territory would fall within a 10 km-wide corridor which would need to be evacuated because of radioactivity carried by the prevailing wind.

Nonetheless, the Government of Hongkong needed to have qualified, technical people who could respond to the realities prompted by Daya Bay's existence.

Said one source: "The Hongkong administration has no background in dealing with and responding to the realities of nuclear power.

Real need

"There exists a very real need, at the political and the social level, to have a contingency plan, one which would cater for the remote possibility of an accident at Daya Bay actually coming to pass.

"In my view there is no technical need but, on the imperative to which I have just referred, the need is there and should be met.

"The problem, of course, of evacuating six million people at short notice, is frankly beyond comprehension.

"But phase two, based on information which will have to be given to us by the Hongkong Government, will deal with, essentially, what can only be termed a reactor accident assessment report relating, of course to the circumstance of Hongkong.

"But given the realities of evacuating six million it is envisaged that it will not be full blooded."

The sources said Harwell's contract with the Hongkong Government required it to make an appraisal of a plan for background radioactive monitoring; to advise on the equipment that such a plan would need; to advise on public education; to assess the consequences to Hongkong of an accident at Daya Bay; to advise on contingency planning and train some of their staff.

"In short, the Government of Hongkong seeks, quite rightly, to make use of Harwell's technical knowledge gained over 30 years.

"We have recommended that various monitoring teams be established, to operate in the case of an accident.

"That is, that an emergency organisation exist, including for example, a process of quick and effective media liaison, a quick and effective dissemination of public information.

"This is all part, of course, of having a contingency plan. The organisation need not be full time, otherwise the cost would be prohibitive. It would operate like civil defence."

British Commitment to Plant

Hong Kong SOUTH CHINA MORNING POST in English 13 Sep 86 p 2

[Text] THE British Government is committed to the Daya Bay nuclear plant — although the deep concern of Hongkong people has been fully taken into account, Executive Council member Miss Maria Tam said yesterday.

"The British Government is going ahead with the nuclear plant as part of its energy policy and Britain is committed to using the plant," she said.

However, Miss Tam said the British Government is "definitely sympathetic" to the controversy and the deep concern of the Hongkong people on the plant's safety aspects.

British Prime Minister Mrs Margaret Thatcher has already said the Government is confident the Daya Bay plant will be constructed and operated to the highest possible safety standards.

Miss Tam returned alone last night from London after she and her Exco colleagues, led by the Governor, Sir Edward Youde, briefed British ministers on Hongkong's latest developments and public feeling on the nuclear plant issue.

Sir Edward and other Exco members are expected to return today.

On the Chinese invitation to the members of the Legislative Council's nuclear fact-finding delegations to visit Beijing later this month, Miss Tam said she hopes she will come back with more guarantees on the plant's safety.

The Legco members will explain to the Chinese leaders the fact-finding reports and a position paper will be presented to the Chinese leaders expressing the concern of the people of Hongkong, she said.

The importance of next year's review of the political structure in Hongkong was also discussed by the Exco members in London.

Miss Tam said the British Government was committed to the 1987 review.

On Hongkong's mood in favour of direct elections, Miss Tam said details of the political review had not been touched on in London, although direct polls were one form of election to be discussed in the review.

/12379
CSO: 5150/0025

HONG KONG

REPORTAGE ON DAYA BAY STUDY TEAM'S VISIT TO PRC

Price of Power Discussed

Hong Kong HONGKONG STANDARD in English 19 Sep 86 p 2

[Article by Andy Ho]

[Text] **CHINESE officials have refused to assure the Legco delegation in Beijing that future supplies to Hongkong of nuclear-generated power will not be more expensive than that from coal-fired generators throughout the 30-year life span of the Daya Bay nuclear power plant.**

This was one of the requests councillors put forward to the Chinese authorities in one of the 30 observations of their 213-page fact-finding report on nuclear power generation.

Under present arrangements the Guangdong nuclear power joint venture company has only given an assurance that 45 percent of the power they will be selling to the China Light and Power Co will not be more costly than conventionally-generated electricity.

Mr Allen Lee, leader of the Legco delegation, said the nine-member Chinese team told the visiting councillors during discussions yesterday that there were two main reasons for their decision.

He said the Chinese team pointed out that it will take seven year to build the Daya Bay plant and that they have already given a six-year price guarantee.

The Chinese delegates said it was likely that during these 13 years fossil fuel will become increasingly scarce and, therefore, more costly.

They expect nuclear generated power will not be more expansive in comparison even after the six-year period.

They added that the Guangdong Nuclear Investment Co, a 75 percent partner in the Guangdong Nuclear Power Joint Venture Company, has already offered favourable terms, as the first six years of operation are expected to be most costly throughout the plant's lifespan.

Another leader of the Legco team, Miss Maria Tam, said the Chinese have agreed to authorise the Guangdong and Shenzhen authorities to discuss directly with the Hongkong Government the suggestion that a cross-border agreement be signed between the two places to monitor the operation of the plant.

Meeting with Nuclear Safety Officials

Hong Kong SOUTH CHINA MORNING POST in English 20 Sep 86 pp 1, 2

[Article by Albert Chan]

[Text] A SENIOR Chinese nuclear official said yesterday it was "inappropriate" for Mr Jiang Shenjie to head the country's nuclear licensing authority and at the same time retain his post in the Nuclear Industry Ministry (NIM).

In a rare and frank comment on the possible conflict of interest of Mr Jiang in his dual role, Mr Ma Fubang said the present arrangement was inevitable because of limits in resources in the nuclear industry.

He said no one was sure when or if Mr Jiang would relinquish his role in the NIM.

"It would be up to the highest authority to decide," he said.

Mr Ma is the director of the Nuclear Electricity Bureau of the NIM and is also a director on the board of the Guangdong Nuclear Power Joint Venture Company, which is a merger of Hongkong's China Light and Power Company and its Chinese counterpart.

The company was set up to build and run the Daya Bay nuclear power plant and is under the control of the NIM.

China set up the National Nuclear Safety Administration (NNSA) last year as an independent agency under the State Council to monitor the safety of the country's nuclear power plants and act as the licensing authority to all civil nuclear installations.

Mr Jiang was appointed as director of NNSA.

But critics have pointed out that Mr Jiang would face a conflict of interest because he still retained his position as head of the Science and Technology Commission at the NIM.

Mr Ma yesterday explained that the commission was a consultative body comprised of elderly and semi-retired scientists and did not have an executive function.

But he admitted the dual role of Mr Jiang was not satisfactory.

"Personally, I think this is inappropriate," he said.

He disclosed that the issue was discussed in a meeting on Thursday between the visiting Legislative Council delegation and the Vice Minister of NIM, Mr Zhou Ping.

Mr Ma said that when China decided to establish the NNSA it had to find somebody who was not only experienced in the nuclear field but well respected in the industry, because the NNSA was the body to regulate the whole industry.

Mr Jiang was picked because he had both qualities and China could not find someone else more suitable, said Mr Ma.

"He is now devoted to the work at the NNSA but he will also retain his role as head of the Science and Technology Commission at the NIM," said Mr Ma.

Mr Ma revealed that almost half of the nuclear experts now working at the NNSA under Mr Jiang originally worked for the NIM.

Mr Ma yesterday accompanied the Legco delegation to the Nuclear Research Institute of Beijing.

The Legco delegation met representatives of the NNSA in the afternoon for more than two hours.

A leader of the Legco delegates, Miss Maria Tam, said later she fully believed that the Chinese would ensure the NNSA would be independent from the NIM.

"Those working at the NNSA come from many different government departments and organisations and not all are from the NIM," she said.

"The Chinese told us that there will be independence of the NNSA because it is a state policy and it has been laid down in the law.

"I don't have any reason to doubt their sincerity," she added.

Another leader of the Legco delegates, Mr Allen Lee, said the Nuclear Research Institute could be compared with the Tokai Institute in Japan which he had visited last month but the Chinese institute still had "some ways to go."

"To me, though, it is a bit of a surprise that China has an institute at this level.

"The set-up itself in some ways is impressive but it still has some ways to go. The Japanese institute has much more advanced equipment," said Mr Lee.

Mr Stephen Cheong, another member of the delegation, added: "What we see today gives us some confidence that nuclear industry in China is developing."

He said he was happy to learn that some of the experts working at the institute would be transferred to work on the Daya Bay plant.

More on Nuclear Safety Meeting

Hong Kong HONGKONG STANDARD in English 20 Sep 86 p 1

[Article by Andy Ho]

[Text] **MEMBERS of the Legco delegation in Beijing gave a vote of confidence to both Chinese nuclear technology and its safety inspectorate system after meeting officials of the National Nuclear Safety Administration yesterday.**

Mr Zhang Yuman, Vice-Director of the NNSA, yesterday had a two-hour discussion with the councillors on Chinese nuclear safety regulations, licensing of nuclear power stations, monitoring system and the training of technical staff.

Miss Maria Tam, who heads the Legco team, said the Chinese have said repeatedly that the Chinese State Council has already granted full independent status to its nuclear safety inspectorate arm — the NNSA.

She said the Legco delegates have no reason to believe that the Chinese will not try their utmost to enforce the nuclear safety guidelines.

"There will be independent inspectorate bodies in both the future Guangdong Daya Bay and another Chinese nuclear power station.

"Though neither of the two are now under operation, the elites involved in the projects are not just drawn from the Ministry of Nuclear Industry and these people are strictly speaking not under the direction of the ministry," Miss Tam said.

She added that the Legco members have also seen a draft copy of the future Chinese nuclear regulations, and they are convinced that China will stick to the principles of the safety measures.

Another member Stephen Cheong said the experts responsible for the nuclear

programmes are not just young but aggressive.

"Among the some 130 technical staff members, many have foreign training. I believe my colleagues will have no doubts about the qualifications of the Chinese nuclear work force," he said.

The councillors also have no qualms about the dual role of Vice-Premier Li Peng, who oversees both the nuclear safety monitoring authority, the NFA, and the nuclear programme executive body, the Ministry of Nuclear Industry.

Another team member, Dr Richard Lai, who has been critical of the Daya Bay investment, said his doubts on the project have been reduced because of the present visit.

But he will still report public anxieties in Hongkong over the plant to the top Chinese officials. He will take the issue to Vice-Premier Li Peng in a one-hour session today.

Mr Ji Peng-fei, Director of the Hongkong and Macau Affairs Office, will host a farewell banquet for the 11 Legco delegates tonight. The Legco members will take an early flight to return to Hongkong tomorrow.

Meanwhile, a UK embassy source said the managing director of Britain's General Electric Co, Mr R. Davidson, will arrive in Beijing tomorrow for the contract-signing ceremony for the HK$27 billion Daya Bay deal which is scheduled for September 23.

GEC is a major contractor for the conventional turbine of the power station.

Team Leader Reviews Visit

Hong Kong SOUTH CHINA MORNING POST in English 22 Sep 86 pp 1, 2

[Article by Frank Choi]

[Text] HONGKONG councillors will continue discussions with China Light and Power Company in a bid to ensure that Hongkong will have cheaper electricity from nuclear power than from coal or oil-fired energy.

And China, in estimating future power charges from Daya Bay after the guaranteed period expires, is expected to adopt Hongkong's policy for public utility charges – operation costs plus a reasonable profit margin.

The Hongkong Nuclear Investment Company's contract for Daya Bay guarantees that electricity for the first six years of operation will be cheaper than coal-fired or oil-generated energy.

This message was brought back yesterday by the 11-member Unofficial Members of the Executive and Legislative Councils overseas fact-finding delegation which returned after a five-day visit to Beijing.

Mr Allen Lee said Umelco would try to get more details of the contract from CLP, although members understood it was a binding commercial contract which could not be re-opened for negotiation.

He said Chinese Vice-Premier Mr Li Peng had told the delegation that although China was sympathetic to Hongkong people's concerns, once commercial contracts were signed no promises should be made outside the terms of the contracts.

"Although the price in 13 years from now (seven years for construction of the plant together with the guaranteed first six years) was too remote for consideration of future tariffs, various indications have shown that the price of electricity from nuclear power should be cheaper than coal or oil generated energy," he said.

Mr Lee described the Beijing visit as "very useful and fruitful". Members discussed their fact-finding observations with Chinese officials and visited nuclear research institutes to meet scientists and engineers working in nuclear energy.

Said Mr Lee: "We were impressed by their breadth and depth of knowledge, and close contacts with their counterparts in France, US, Japan, West Germany and other countries.

"We noted their long working experience in the nuclear field in China, and we were also pleased to learn of their extensive knowledge gained through those international contacts.

"Similar to all countries we visited, their approach to nuclear power places safety and quality as top priority. We felt assured that they will make every effort to ensure the safety of Daya Bay plant is in accordance with the highest international standards."

Mr Lee said Mr Li and other relevant Chinese authorities indicated that they fully recognised and understood Hongkong people's worries over Daya Bay.

He said Chinese officials had not taken the Daya Bay project lightly, and since 1979 many Chinese experts and leaders had travelled extensively to take a close look at nuclear plants all over the world, and were deeply aware of the need for the highest safety standards.

On the delegation's other tasks in convincing Chinese leaders to adopt their observations, Mr Lee said they had received favourable and positive responses:

- Mr Li gave his support in principle for the setting up of an independent advisory body, with Hongkong participation, on safety and management aspects of Daya Bay, but added that the terms of reference and other operational details had yet to be worked out.

- Chinese leaders gave assurances on HKNIC's management participation at all levels throughout the lifespan of the plant.
- There was a clear delineation in responsibilities between the Government ministries and agencies for management and regulatory control of nuclear power plants.

The National Nuclear Safety Administration operated as an independent regulatory body, with the necessary authority prescribed through legislation.

It aimed to ensure the safe and quality construction and operation of nuclear power plants strictly in accordance with the laid-down safety regulations.

- Details of a comprehensive and well co-ordinated emergency plan would be drawn up in the next two or three years in accordance with the International Atomic Engengy Agency standards and the specific needs of the areas in the vicinity of the plant.
- On design and construction of the plant, the delegation was assured that the site was not linked to any underground water source.

Members were told that a hydrogen-recombiner system and a system achieving the same objective of the pressurised containment penetration design used in the Zion plant in the United States had been incorporated in Daya Bay, while any future system that would provide greater safety would be looked at.

The French had yet to submit detailed data on a proposed new sand filter safety system to the Joint Venture Company, but the Chinese stressed that the financing for this item was already in the budget and the final decision would be based solely on engineering grounds.

- In response to Umelco's proposal for cross-border arrangements to exchange information and co-ordination of contingency planning, Chinese authorities told the delegation that arrangements had been made between the Guangdong environmental protection authorities and Hongkong Royal Observatory for the monitoring of radiation.

More Details on Visit

Hong Kong HONGKONG STANDARD in English 22 Sep 86 p 1

[Article by Esme Lau]

[Text]

CHINESE Vice Premier Li Peng has played down the widespread concern in Hongkong over the Daya Bay nuclear power plant by saying an opinion poll showing heavy opposition to the facility was not a formal survey.

Dr Richard Lai said the Legislative Council delegation to Beijing over the weekend told Mr Li that Hongkong residents are worried about the plant, which will be built 50 kilometres northeast of Hongkong island.

The contracts are expected to be signed tomorrow **(see report on this page)**.

"Mr Li said such opinions were not taken by a formal survey.

"But he stressed everyday he reads the news and he understands well the feelings of the Hongkong people."

A newspaper survey of 8,000 people made public this month showed that 73 percent of those polled opposed the plan.

The results were nearly the same as an earlier newspaper poll.

One million Hongkong residents have also signed petitions asking that the plant be shelved.

Dr Lai, who has advocated the construction of the plant be halted pending further study, returned from the trip to Beijing feeling that, since the construction contracts were about to be signed, people should be prepared to live with the plant.

"Hongkong people should consider whether it is still useful to still object to the construction of the plant," he said at an airport press conference following their three-day visit to China. It included a 70-minute meeting with Mr Li, who oversees China's nuclear industry, a tour of China's Nuclear Research Institute and meetings with top-level nuclear scientists and engineers.

Delegation leader Allen Lee read a statement calling the trip "useful and fruitful," and added the councillors were impressed that China's National Nuclear Safety Administration made "safety and quality" a top priority.

During Saturday's meeting with the Vice-Premier, the Chinese refused to extend the guarantee of power prices from Daya Bay beyond the first six years of the plant, scheduled to come into operation in 1993.

Mr Lee said he was not worried by that refusal.

"The Chinese believe that by then the price of electricity will eventually be reduced to a level lower than the conventional means of power generation," he said.

The Legco member added that the guarantee ended after six years of operation because the agreement was already reached and the Chinese did not feel like making any alterations at the present stage.

"I personally accept this explanation and I believe nuclear energy will be cheaper than coal-generated electricity by then," Mr Lee predicted.

The other group leader, Miss Maria Tam, added that the price estimate derived from reports and forecast of China's financial experts.

Mr Lee said the members were impressed with the breadth and depth of nuclear knowledge and close contact of Chinese with counterparts in France, West Germany, Japan and the United States.

But he added that details of a comprehensive emergency plan will be ready in the next two to three years.

Vice-Premier Li also assured the delegation that the plant site will not be linked with any underground water source.

No final decision was made on the implementation of a sand filter system, a suggested safety measure, but the Chinese explained it was included in the budget and the decision would only be based on engineering grounds.

The Chinese had also suggested that arrangements could be made between Guangdong and Hongkong on the exchange of information and coordination of contingency planning.

A cross-border agreement had been made with Guangdong Environmental Protection Authority and Hongkong Royal Observatory for monitoring radiation from the Daya Bay plant.

Mr Li also told the Legco visitors that he supported the principle of local participation in the independent advisory body on safety and management aspects of the plant.

Debate To Continue

Hong Kong SOUTH CHINA MORNING POST in English 27 Sep 86 p 1

[Article by Wong Wing-Hang]

[Text] THE Legislative Council debate on Daya Bay will be held after all. Councillors yesterday agreed unanimously to a motion calling for more information from the Government on the nuclear project.

The decision, which represents concessions from both sides, is seen as a bid to improve the public image of the council, affected by acrimonious debate over the power plant.

It is the first time since the Chernobyl incident that all the Unofficial members have taken a uniform stand on the issue.

The unanimous move is regarded as a concession by those members who opposed a special Legco meeting to debate the Daya Bay issue during the summer recess.

The debate will be held when the motion is put forward at the October 15 Legco sitting, an in-house meeting agreed yesterday.

The wording of the motion has to be finalised, but a draft version says:

"This council requires the Government to provide to this council details of the arrangements regarding the safety and tariff for the purchase of electricity from the Daya Bay nuclear plant and to provide supporting documents without breaching commercial confidentiality and to explain whether or not such arrangements are in the overall interest of Hongkong people."

Mr Martin Lee originally proposed a strong worded motion calling for "all the supporting documents" to be presented by the Government.

Some members opposed it on the grounds it might breach the commercial confidentiality of the China Light and Power Company and the motion was modified accordingly.

The anti-nuclear members, who feared their insistence on such wording would foil their chance of having a debate, finally agreed to the change.

It is understood that public pressure played a part in bringing around other members who were earlier opposed to a debate. They are anxious to show they are as responsive to public opinion as their anti-nuclear counterparts.

The interest of the senior member, Miss Lydia Dunn, in preserving the image of Legco and avoiding public confrontation between members also contributed towards them reaching this stand.

Miss Dunn stressed the importance of consensus at a briefing after the in-house meeting.

She said nuclear power generation was an issue of world debate after the Chernobyl incident and Hongkong was no different.

Although Legco members might hold different views over Daya Bay, they had the same aim in trying to allay the anxiety of Hongkong people, she said.

"We firmly believe Legco can best serve the public on the basis of consensus.

"We may not always be able to agree on every single issue, we are after all 46 individuals from different backgrounds, but we will not let honest difference in opinion undermine our respect for each other and our unity," Miss Dunn said.

She added that no member had objected to the idea of holding a debate on the Daya Bay issue.

"It was only a matter of timing since most members felt a special meeting during the recess was not needed," she said.

They were now taking the first opportunity after Legco reopened to debate the issue, she added.

A debate will not be possible at the first Legco sitting on October 8 since the Governor, Sir Edward Youde, will deliver his annual policy speech that day. The alternative is the second sitting on October 15.

The motion to be put forward that day indicates the compromise that has been reached.

During yesterday's inhouse meeting, the members also discussed whether they should apply the Power and Privilege Ordinance to acquire the related documents from the Government.

Miss Dunn said it was too early to say and there were no uniform views among members.

She said some members thought the more information the Government provided to the public the better, while others feared the breach of commercial confidentiality might affect the confidence of investors.

The members were also briefed on the visit to Beijing by the overseas fact-finding delegation on nuclear power.

A detailed report by the delegation will be ready in a week's time.

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HONG KONG

REPORTAGE ON SIGNING OF DAYA BAY CONTRACTS

Contracts Signed 23 Sep

Hong Kong SOUTH CHINA MORNING POST in English 24 Sep 86 pp 1, 2

[Article by Albert Chan]

[Text] THE controversial $28.8 billion Daya Bay nuclear project was officially launched yesterday with the signing of all the key contracts – but British and French contractors, the joint venture company and financiers settled several major disputes about finance arrangements only hours before the ceremony.

The various parties involved, including the Bank of China, the foreign banks and the Guangdong Nuclear Power Joint Venture Company (GNPJVC), were still split on several outstanding issues as late as Monday night.

It was only at the last minute – literally a few hours before signing was due yesterday, that the negotiating obstacles were cleared.

"This is quite normal in negotiations – those involved will not move until the very last minute," said Mr Peter Tse, GNPJVC's deputy financial manager.

It was also revealed yesterday that negotiations for the project almost broke down late last year because of a disagreement over the exchange rates that apply for the Europe-based contractors.

Billed as the biggest joint venture in China since the country opened its doors in 1978, it took some six years of tough negotiations for the two French companies, Framatome and Electricite de France (EdF), and Britain's General Electric Company to strike deals with China.

It was disclosed yesterday that the joint venture company set up to build and own the plant will pay 6.3 billion French francs to Framatome for the 900 megawatt reactors, 1.3 billion francs to EdF for overall engineering servicing and £250 million to GEC for turbine generators.

Apart from these three contracts, the other main agreements signed yesterday involved loans from British and French banks to finance the project.

Mr Tse disclosed that late last year, as the joint venture company was about to sign memorandums of understanding with the equipment suppliers, the company insisted that the OECD rate at the time, 9.5 per cent, would drop by the time contracts were signed.

The joint venture company asked that the rate be adjusted when contracts were signed, to a lower level if the rate fell, or remain at 9.5 per cent if it rose.

The British and French contractors refused to accept this and the negotiations almost broke down.

The British and the French subsequently agreed to the Chinese demand.

For the loan arrangements, Banque Nationale de Paris will lead six other French banks in a loan of 13 billion francs to finance the 6.2 billion franc reactors and nuclear fuel as well as the engineering servicing contract that is worth 1.3 billion francs. Interest payments will account for the balance.

The Midland Bank of Britain will head 10 British banks in arranging a loan of US$420 million for financing the £250 million British generators.

The loans in fact are borrowed by the Bank of China on behalf of the GNPJVC and the Bank of China will act as a guarantor.

The interest rate has been fixed at 7.4 per cent for the whole repayment period, which is 15 years from the start of commercial operation of the plant.

There have been many estimates on the eventual cost of the whole project but with the signing of the key contracts yesterday, the closest estimate now is US$3.7 billion.

Broken down, the overall cost of building the plant will be US$3.5 billion, but the two GNPJVC partners – China Light and Power Company and its Chinese counterparts – have already come up with US$0.4 billion in equity, which means the GNPJVC now only has to borrow US$3.1 billion.

Of this US$3.1 billion, another US$0.6 billion is added as a "standby credit" to cover possible currency fluctuations and other cost overruns during construction.

Thus, the GNPJVC will borrow a total of US$3.7 billion from the foreign banks via the Bank of China.

The loans from the British and French banks add up to about HK$19 billion, but the total cost of the plant will be about $28.8 billion.

The balance is for other work on the project including civil work, site formation, erection of equipment and so on.

Following the signing ceremony yesterday, the GNPJVC will now submit the contracts to the Chinese State Council for final endorsement, which is expected to be virtually a formality.

The endorsement has to come before October 7. The GNPJVC will then issue a document known as an "authorisation to proceed" to each of the three main contractors, Framatome, EdF and GEC.

The letters of intent signed in March this year and taking effect in April stated that if this authorisation to start work does not come on or before October 7, the deal is off and fresh negotiations must be started.

After this authorisation, the three contracts will go full steam ahead with their construction.

The contracts stipulate that the two suppliers, Framatome and GEC, with co-ordination and supervision by EdF, must complete construction of the first reactor 72 months after October 7, that is by October 1992.

The second reactor should be finalised nine months after that, in July 1993.

On-site preparatory work in fact began as early as April 1984 and excavation for the reactors on August 18 this year.

Before the signing ceremony, Chinese Premier Mr Zhao Ziyang invited the top officials of the contractors, banks and the GNPJVC for a brief meeting at Zhongnanhai at the heart of Beijing where all top Chinese leaders work and stay.

"It was mainly a chit-chat," said Sir Sidney Gordon, vice-chairman of China Light and Power.

Taking part in the signing ceremony were Chinese Vice-Premier Mr Li Peng, GNPJVC general manager Mr Zan Yunlong, Framatome president Mr Jean-Claude Leny, EdF general manager Mr Jean Guilhamon, GEC managing director Mr Robert Davidson, BNP president Mr Rene Thomas, Bank of China president Mr Wang Deyan, as well as several dozen senior officials of China, the various companies and banks.

The British Ambassador to Beijing, Sir Richard Evans, and top French diplomats also witnessed it.

Mr Leny, in a short press briefing after the ceremony, refuted rumours that Framatome had given the GNPJVC a substantial discount in the deal.

He said the 6.3 billion francs price tag was not very different from a similar export contract in South Korea.

The difference in price was between one and five per cent, he said.

But Mr Leny did admit Framatome is getting a "very tight profit margin" in the deal.

The Framatome contract includes the supply of nuclear fuel, but the GNPJVC has not decided where to buy the uranium from.

EdF officials also spoke to the press after the ceremony,

The signing ceremony yesterday was colourful and disorderly, involving a virtual game of musical chairs.

As a total of seven contracts were signed and each contract often involved different parties and different numbers of people, much time was spent removing and adding chairs.

The name plates on the signing table also had to be changed.

In the program Chinese officials distributed to the media, there was a mistaken reference to Framatome's subsidiary, Fragema, taking part in the signing ceremony.

Actually, it was Framatome that signed on the subsidiary's behalf. Fragema will be manufacturing or supplying nuclear fuel under the contract.

Councillors Seek Details

Hong Kong SUNDAY STANDARD in English 28 Sep 86 p 1

[Article by Andy Ho]

[Text] ANTI-NUCLEAR Legislative Councillors have threatened to exercise their right to force the release of confidential details about the Daya Bay nuclear project.

Councillor Szeto Wah said yesterday he and some colleagues will consider using the Powers and Privileges Ordinance to obtain secret financial data on the project, if the Government fails to give them the information they want.

"We as Legco members are duty-bound to find out all information which is of public interest," he said.

In an in-house meeting on Friday, the unofficial members agreed to table a motion at the October 15 Legco meeting requesting the Government to "provide details of the arrangements regarding safety and tariff for the purchase of electricity from the Daya Bay nuclear power plant."

They also call for clarification of whether the arrangements will "sufficiently safeguard the long term interests of Hongkong people."

But Mr Martin Lee's original motion demanding disclosure of "all the supporting documents" has been watered down. The final motion now only asks for "such supporting documents as do not breach commercial confidentiality."

Mr Szeto said he will try to exercise the law to find out whether China Light and Power Company will make undue profits from the Daya Bay project.

A controversial confidential document is the Lazard Brothers report commissioned by the Government on the financial viability of the HK$ 28.8 billion Daya Bay investment.

The Guangdong Nuclear Power Joint Venture Company has agreed to supply nuclear-generated electricity to the CLP at a price not higher than that produced from a local coal-fired station for the first six years of operation. But Mr Szeto said he wants to know the CLP's arrangement beyond the guaranteed period.

Meanwhile, Mr Anthony Ha, a spokesman of the 116-group Joint Conference for the Shelving of the Daya Bay Nuclear Power Plant, yesterday extended his coalition's support for the councillors' move.

Response from China Light, Power

Hong Kong SOUTH CHINA MORNING POST in English 29 Sep 86 p 3

[Article by Wong Wing-Hang]

[Text] CHINA Light and Power Company Limited is willing to co-operate and provide information required by Legislative Councillors on its participation in the Daya Bay nuclear plant.

Mr Steven Poon, director of the Hongkong Nuclear Invesment Company Limited, a subsidiary set up by CLP to take part in the Daya Bay project, said yesterday that the company would do its best to satisfy Legco members' demands.

"I believe their request is a reasonable one and we will provide information they have asked for," he said.

However, the company will still hold back some sensitive information which is considered essential to commercial confidentiality.

Mr Poon said CLP was a public company listed on the stock market, and it was not appropriate for it to reveal its profit before reporting to its shareholders.

"We have nothing to hide and we are glad to co-operate with the Legco members.

"Besides some information of this kind, the rest can be made available to the Legco members through the Government," he said.

The Legco members agreed unanimously last week to put forward a motion at the October 15 sitting calling on the Government to provide more information about the safety and tariff arrangements of the purchase of electricity from the Daya Bay plant.

But the motion has carefully excluded demanding information which may breach commercial confidentiality.

Mr Poon said that the public would be protected from an unreasonably high level of profit by the HKNIC, although it was not covered by the Government's scheme of control as the CLP was.

The scheme of control provides that CLP can reach a certain level of profit in relation to its capital investment.

There were fears that if the Daya Bay plant was counted as part of the CLP assets, the power company might raise its profit level tremendously.

Persuade

Mr Poon said it was not possible for the Government to extend the scheme of control to cover the HKNIC.

"HKNIC is a company formed with its China counterpart to build a power station in China. Because its assets are in China, it is outside the jurisdiction of the Hongkong Government and therefore it cannot be, technically, a company under the scheme of control in Hongkong.

"But having said that, Hongkong Government has realised this and also has realised the responsibility of the Government in making sure that the investors of HKNIC do not obtain profits more than what we call the reasonable profit, which is largely spelt out in the scheme of control in Hongkong," Mr Poon said.

Meanwhile, CLP is gearing up its public relation efforts to try and persuade Hongkong people to accept the Daya Bay project.

Its public affairs unit will be split into two sections by the end of this year, one handling CLP affairs and the other HKNIC activities.

Mr Poon said an extensive range of public education programs had already been planned to start before the end of the year.

The programs include the production of a variety of brochures and leaflets, films and videos, audio visual programs and exhibitions.

"In addition, regular briefings and press tours to Shenzhen and Daya Bay will be conducted and an extensive schedule of briefings to district boards and other community groups will be carried out," he added.

The programs would not be one-off activities, but would be spread over the construction period of the project and continue throughout the plant's operation life, he said.

- Hongkong would be given early notification if any accident occurred at the Daya Bay nuclear power plant under an international convention which China has just entered.

The message was brought back by the Principal Assistant Secretary for Economic Services, Mrs Emmeline Mok, who returned yesterday from a special meeting in Vienna of the International Atomic Energy Agency.

The meeting adopted two agreements calling for early notification of nuclear power station accidents and emergency assistance for such accidents.

Importance of Plant to Hong Kong

Hong Kong HONGKONG STANDARD in English 23 Sep 86 p 6

[Editorial Report] CHINA today puts the final seal on the Daya Bay nuclear power project. Elsewhere a million protest signatures would have seen to it that the final contracts never got endorsed.

But this is not to be. Hongkong people have made their position clear. Ultimately, as everyone has known all along, China has the final say. The plant is to be built on Chinese soil and the Chinese have to take into consideration their sovereign rights. They are also supremely confident of their ability to run the facility and the expertise, both foreign and local, at their disposal.

The Chinese are not callous. They have repeatedly said they will heed Hongkong views. They understand our fears. In recognition of this they have put far greater emphasis than previously on the safety aspects of the plant.

More, they have agreed that Hongkong people should sit on an independent advisory body to monitor safety and management. If all works out well Hongkong should be alerted moments after anything goes wrong, no matter how minor the incident. These are no small gains for Hongkong.

We would hope that nothing goes wrong ever. But it is for China to spare no expenses whatever to ensure this. Only then can all of us be assured that Daya Bay, only 50 kms from us, will not jeopardise the continued stability and prosperity of the territory.

This is paramount, not merely to Hongkong, but to China as well. Hongkong's interests are China's interests, hence that agreement to allow the British to continue managing the territory for another 50 years after 1997.

Which, of course, makes safety only one of the two major concerns of Hongkong people as far as Daya Bay is concerned. The other is the economics of the project.

A prime consideration for Hongkong participation in the project is the assurance of enough power at economic costs to fuel the progress we expect in coming years.

The capital outlay for a nuclear plant is astronomical. Some US$26 billion in the case of Daya Bay. The temptation to recover costs quickly at consumer expense can be irresistible. Hence the Legco mission's attempt to secure a guarantee from the Chinese authorities on prices beyond the first six years of operation.

This guarantee has not be forthcoming. The Chinese have put forward valid reasons. Much of the world's oil reserves is known, so is the rate of consumption. Inevitably, as these reserves are depleted, nuclear energy will become much cheaper. Besides, China has completed negotiations and are averse to alterations.

Fair enough but we should bear in mind that Daya Bay has put a stop, for many years to come, any further thought of increasing our own energy-production capacity. So there should be periodic reminders that our continued progress hinges on power at economic cost. A contingency plan for power conservation in the event of an accident at Daya Bay or an unacceptable price hike in later years is worthy considering at this point.

For the moment, as pens are poised to sign on the dotted line, the picture is not entirely bleak. While the bulk of the energy from Daya Bay will come to Hongkong in the initial years, a great deal of it will go towards powering the development of southern China.

A prosperous southern China will obviously benefit us. The glaring economic gap between Hongkong and its immediate neighbourhood to the north is not healthy. The continuing flow of illegal immigrants is one side-effect of this gap we can do without. There are many other side-effects; too many to enumerate here.

Ultimately, a wealthier neighbourhood to the north will make Hongkong's return to the Chinese fold that much easier, smoother, less painful.

Hongkong has a big role to play in the modernisation of the mainland. Daya Bay can be looked on as a major contribution, no matter what fears we continue to harbour long after today's ceremony in Beijing.

These fears must be put aside. Not because they are without basis. But because the project is far beyond our control. China has made its decision and we must live with it.

We must repose our trust in the Chinese nuclear experts and our own people who will be sitting on the advisory committee or monitoring the atmosphere on a day-to-day basis at the Royal Observatory.

And we must choose our people wisely for these tasks. Human beings are fragile, their behaviour erratic, and prone to mistakes. Human error has been responsible for many of the nuclear plant accidents, including Chernobyl. We would need people of much sterner stuff for the very tedious job of monitoring Daya Bay.

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LEGISLATIVE COUNCIL REPORT ON DAYA BAY 'CONTRADICTORY'

Hong Kong SOUTH CHINA MORNING POST in English 14 Sep 86 p 11

[Article by W. H. Wong]

[Text] THE report on nuclear plants by the Legislative Council's overseas fact-finding delegations has been criticised as biased and contradictory.

The charge came yesterday from the pressure group Meeting Point, which fears the report will be accepted by the Chinese Government as representing the views of the whole council on the contentious Daya Bay issue.

And the group has backed calls for a public debate by the Legislative Council so that individual councillors can make known their stand on the nuclear issue.

Meeting Point spokesman Mr Chan Mo-pow told a press conference yesterday the delegations failed in their mission to gather the facts.

"Most of the material in the report is one-sided in supporting the use of nuclear energy," he said.

"This only leads us to doubt the neutrality of the delegations."

The report, published two weeks ago, accepted pro-nuclear views unconditionally, but treated anti-nuclear views with distrust, Mr Chan added.

Referring to a referendum in Austria, the report said the construction of a nuclear plant was voted down by a "slight margin" of 50.1 per cent to 49.9 per cent, he said.

He added the report quoted an official who said the result was affected by "political" reasons.

The report also down-played a referendum on the Three Mile Island nuclear accident in the United States, in which 70 per cent of the votes were against the plant, he said.

Mr Chan said it was "regrettable" that the countries visited by the delegations, with the exception of Austria, were all supporters of nuclear energy.

"They were only forced to visit Vienna, because the International Atomic Energy Agency headquarters is there," he said.

He questioned why the delegation did not visit anti-nuclear countries, such as Sweden.

Mr Chan said the report left many questions unanswered.

These included why a petition that received more than one million signatures was ignored by the authorities, the impact on Hongkong's prosperity should there be a radiation leak, and the lack of any contingency plan in the event of an accident at Daya Bay.

However, he said his group felt the most basic and important question left unanswered involved the economic aspect of the project.

"The report leaves us puzzled as to why Hongkong needs a nuclear plant," Mr Chan said.

● Seven submissions on the Legco report have been received by the council so far.

A spokesman for the Office of Unofficial Members of the Executive and Legislative Councils (Umelco) said five of the submissions were from individuals and two from organisations.

Although yesterday was the deadline for submissions, the spokeswoman said more are probably still in the mail.

For example, the Joint Conference for the Shelving of the Daya Bay Nuclear Plant has notified the office it will be making a submission, which has not been received yet, she said.

Members of the public were asked to submit their views on the report, which was prepared by two groups of Legco members who visited nuclear power plants in the United States, Europe and Japan.

The councillors said they would collate these views and present them to the Chinese Government.

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HONG KONG

DAYA BAY OPPONENTS REPORTED TO LOSE HEART

Hong Kong SOUTH CHINA MORNING POST in English 17 Sep 86 p 3

[Article by Wong Wing-Hang]

[Text] HONGKONG people are losing heart in the struggle to have the Daya Bay nuclear plant shelved.

This is indicated in the findings of a survey which began on Monday last week and ended at noon yesterday, according to the survey convenors, a group of Legislative Council members.

Among the 8,862 valid responses, 73.08 per cent objected to the construction of the plant, compared with a similar response of 73.38 per cent during a July poll.

However, the proportion of people supporting the project had increased from the July figure of 10.48 per cent to 13.21 in the latest survey.

At the same time, the number of people calling for the shelving of the project had dropped from 16.14 to 13.71 per cent.

The July survey was conducted by the same group.

One of the convenors of the survey, Dr Richard Lai, said the major aim of the latest survey was to find out whether Hongkong people had changed their thinking on the Daya Bay issue.

He said the public's attitude might have changed in the past two months since a lot had happened including the publication of the Harwell Report, the Legco delegations' overseas visits and reports, and the Governor's visit to China.

"The increase of about three per cent in the number of people supporting the Daya Bay project might mean many people have lost heart in the struggle to have the plant shelved," Dr Lai said.

As they thought it was already impossible to hold up the project, they turned to supporting it with the hope that all safety precautions would be installed.

Dr Lai said at present it was not possible to say whether those voicing support for the project were those who, in the July survey, had asked for it to be shelved.

And until this was ascertained the real reason for the change of attitude would not be known.

"But the general thinking now is that there is no use in opposing the project," Dr Lai said.

Another point, he added, was that many people in the latest survey did not fill in their names and identities on the questionnaires.

As a result, more than 2,000 responses, which made up almost 20 per cent of all the returned questionnaires, were invalid.

Dr Lai said despite assurances of strict confidentiality in handling the questionnaires, there were still fears among respondents that their participation in the survey might be used against them some day.

The findings of the survey were released in a hurry, Dr Lai said, to let the public know the results before the Legco delegation set off for Beijing today.

Being a member of the delegation did not contradict his anti-Daya Bay stand, he believed.

"I will at least have the opportunity to reflect the worries of Hongkong people directly to Chinese leaders. The situation might be worse if I refused to join the delegation," he said.

However, the findings of the survey would not be included on the agenda of the talks between Legco members and Chinese officials.

Dr Lai explained that the team was invited to Beijing as members of the overseas fact-finding delegations and their discussions should therefore be confined to matters arising from the trips.

It would be inappropriate for him to present the survey findings in such circumstances, Dr Lai said.

But he added that he would make use of informal occasions to relay the findings to Chinese leaders.

"There will be ample opportunities such as before and after meetings, or during the dinners, when I can tell the Chinese leaders what Hongkong people think, according to the survey," he said.

Concerning the position paper of the Legco delegation, Dr Lai said the final draft had not yet been worked out.

The Legco members would hold a meeting tonight when they arrived in Beijing to finalise it.

However, Dr Lai said, it had been agreed that the worries of Hongkong people would be given a high priority in the position paper.

● The overseas editon of the *People's Daily* reported yesterday that the date for signing the three major contracts for the Daya Bay project had tentatively been set for next Tuesday.

The newspaper, the official Beijing mouthpiece, quoted the chairman of the Guangdong Nuclear Power Joint Venture Company, Mr Wang Quanguo, as saying that the negotiation and preparation for the project had already taken seven years and China could not wait any longer.

● More than 2,000 people are expected to attend a protest rally next month against the building of the Daya Bay plant.

Organisers said yesterday posters and pamphlets were being printed and 10 guest speakers would address the rally in Morse Park, Kowloon, on October 5.

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HONG KONG

DAYA BAY DISCUSSED AT BROADCAST PUBLIC FORUM

Hong Kong HONGKONG STANDARD in English 29 Sep 86 p 4

[Text] THE 107-member strong Joint Conference for the Shelving of the Daya Bay Plant was asked to change its name yesterday.

"Joint Conference for a Safe Daya Bay Plant" is the name suggested by Kowloon City District Board member Mr Kong Pak-keung, who argued that it would be now pointless to continue striving to shelve the project after the signing of major contracts.

Mr Kong was speaking at a public forum organised by RTHK yesterday at Victoria Park.

The spokesman of the Joint Conference, Mr Anthony Ha, replied that they will stick to the title and objective of the coalition. This was because Chinese officials have stated that if the plant did not meet all the safety requirements, its construction would not proceed.

Another speaker, Legislative Councillor Mr Cheng Hon-kwan, expressed satisfaction over the Chinese acceptance of the opinions of the Legco fact-finding mission during their recent visit to meet the Beijing authorities.

During the programme which was broadcast live on one of the Chinese channels, a highly-charged audience raised all sorts of critical questions which were mingled with disrespectful remarks like "Shut up you pseudo-nuclear experts."

Among the more than 150 participants who packed the audience stand, some of them were members of the anti-nuke coalition while some were District Board members.

Chairman of the Organising Committee of the Nuclear Technology Exhibition, Dr Raymond Ho, emphasised that nuclear education was long-term work. A permanent nuclear exhibition hall is needed for this purpose, he said.

Meanwhile, a China nuclear scientist who came here to lecture at the exhibition, said his country could help train local talent to acquire expertise in nuclear engineering so as to facilitate Hongkong's monitoring of the Daya Bay nuclear plant upon its completion in early 1990s.

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CANADA

SOVIETS ASK ONTARIO HYDRO ABOUT NUCLEAR PLANT SAFETY

Toronto THE GLOBE AND MAIL in English 10 Oct 86 p A3

[Article by Stanley Oziewicz and L. Ray Silver]

[Text] Soviet science and technology officials have asked Ontario Hydro to prepare proposals on the safe operation of nuclear plants, a step that could lead to sales of "housekeeping" services and technology.

The request came during a recent week-long visit to Moscow by a four-man Hydro delegation whose members were invited to discuss nuclear services in the wake of the Chernobyl plant disaster.

"We've been asked to prepare proposals in a number of areas, all related to the safe operation of their nuclear power plants," said Thomas Drolet, business area manager of Hydro's New Business Ventures division, set up 2½ years ago to spin off Hydro expertise and products.

"We are considering all of these areas right now. In some of them, we think there are prospects of honestly helping them on a humanitarian basis — of course, with cost recovery — and other areas that are straight, good commercial-looking ventures.

"My impression is that when the Chernobyl incident occurred, they sat down and said, 'Holy smokes, we've got ourselves a problem and, yes, we'll deal with Chernobyl principally ourselves.' But for the longer term they said it might be prudent to elicit some help from offshore."

Mr. Drolet said the meetings with Soviet officials were arranged through commercial business channels and were not a Government-to-Government affair. He said the invitation was extended by a Soviet import-export company.

He was reluctant to give details of how Ontario Hydro could colloborate with the Soviets, saying he believes nuclear officials from two Western European countries are also interested in making sales to the Soviet Union.

"I don't want them to know what we're doing."

However, he did indicate that the Soviets might be interested in air-cooled radiation-resistant clothing developed by Hydro and manufactured under licence by two Toronto-area firms.

The suits of heavy grade polypropylene protect nuclear workers from radiation given off by tritium, a triple hydrogen atom formed in the heavy water moderator-coolant of Hydro's reactors. The plastic suits completely enclose the wearer, are air-conditioned and come with a respirator and mobile phone.

Mr. Drolet said the Soviets seem interested because of the need to protect construction workers tunnelling under the Chernobyl-4 reactor. Preparing the base for entombment of the disabled reactor, tunnel crews have encountered high radiation, temperature and humidity conditions.

The Soviets are also interested in methods of training nuclear operators and discussing the fast-shutdown capability of nuclear plants. The design of Chernobyl made it difficult to shut down when its core became unstable.

Canada and the Soviet Union are signatories of the nuclear non-proliferation treaty. However, a bilateral agreement between the two countries is necessary before Canadians can sell any nuclear products or expertise involving proliferation of nuclear material.

Without a bilateral agreement, according to Mr. Drolet, the only way to do nuclear-related business is by ministerial permit.

"It's my feeling, knowing the types of items we're talking about — good housekeeping at nuclear plants — there is no connection with nuclear proliferation concerns.

"Since a bilateral agreement doesn't exist, we must be able to convince the federal authorities that this business can go ahead by ministerial permit or it won't go ahead."

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OFFICIALS DESCRIBE SAFE OPERATION OF KOZLODUY NUCLEAR PLANT

Sofia RABOTNICHESKO DELO in Bulgarian 13, 14, 15 Aug 86

[Serialized interviews with Chief Director Eng Georgi Dichev and other officials, identified in text, of First Atomic Power Plant at Kozloduy, apparently occasioned by the Chernobyl nuclear accident, by Iliya Slavchev, special correspondent of RABOTNICHESKO DELO, and Iliya Borisov, Vratsa correspondent of RABOTNICHESKO DELO: "Kozloduy '86--Attention! Zone of Elevated Responsibility"]

[13 Aug 86 p 4]

[Text] 1. Immutable Law

The office of the chief director of the Atomic Energy Combine at Kozloduy is a little strange. At least it seemed so to us. Whether he had given orders that it be arranged this way we didn't ask him, but truly his workplace does not resemble standard ones even though it is furnished in the standard way. All the same, the office "furniture," arranged in a different way, makes a different impression. Even the numerous telephones on his desk stand in a somewhat different way.

Our conversation with Eng Georgi Dichev began banally about him and we should have lost him as an informant had we not asked him what was wrong with the new power-generating unit No. 5; would it not reveal some surprises? He came alive at once.

[Answer] Power-generating unit No. 5 is indeed something completely new for us. Such a unit is under construction for the first time outside the bounds of the Soviet Union. But there are no surprises to talk about.

[Question] We mean its startup in regular operation.

[Answer] Prestartup tests have entered the final stage and we figure on bringing the unit on stream by the end of the year. That will take maximum efforts, of course.

[Question] But won't that be done at the expense of quality?

Without realizing it, with this question of ours we had put our finger on the very problem that our informant regarded as basic.

[Answer] Remember (he said to us), in building an atomic power plant and in operating, repairing and maintaining it, quality is an immutable law. Moreover, we are not talking here about good or bad quality, about high or excellent, world-class or other quality. Here there can be only one quality--the quality built in the design and the technology.

Thus our conversation turned towards the questions that interested us--the stability, reliability and safety in the operation of our First Atomic Power Plant (we had not yet got used to its new name). In the following days we met and talked also with other officials, specialists and workers of the plant. But it was only proper to begin with Eng Georgi Dichev, not only because he is the chief director and boss of this large-scale power complex, but also because he is one of our universally recognized nuclear-power specialists. He is one of the two Bulgarian engineers in this profession to first graduate in Moscow exactly 20 years ago. He came to Kozloduy at the very start of construction, was chief of the engineering division, deputy chief engineer and chief engineer, and now is chief director. He has been awarded the title of Hero of Socialist Labor. We asked him what his estimation was of the plant's stability of operation from its commissioning up till now and whether there had been moments when the atomic reactors had deviated from safe operation. He smiled.

[Answer] A legitimate question.

[Question] Which we would like you to answer as an impartial specialist insofar as possible.

[Answer] The very fact that for 12 years this question wasn't asked shows that it didn't bother anybody. Nor were there any reasons. Even the earthquake in Vrancea in 1977 aroused no uneasiness or doubts. It was very severe, as you remember, and a number of our conurbations along the Danube and in the Danube plain suffered from it, but the power plant--nothing. All its equipment, vessels and buildings withstood the earthquake quite uneventfully. The power units operated normally and we had no grounds or reasons for cutting back their capacity. This event showed that the plant's seismic security is much higher even than provided for in the plan.

[Question] But what is the security of the equipment itself?

[Answer] It, too, embodies very great reserves, a very great margin of strength. These reserves of reliability and security are present in the technology itself, too. For example, the specific load of [several words illegible] nuclear fuel is half that in the power plants of the Western countries. But what is most important is the fact that our reactors have a negative coefficient of reactivity. In more popular parlance this means that if for unforeseen circumstances the power of the reactor begins to increase, then it--the reactor--itself halts this process, i.e., it is self-regulating. The self-regulation concept has been introduced into nuclear-reactor physics and is of extreme importance for their safety.

One of the many important factors ensuring stable AETs [atomic power plant] operation (as the chief director explained to us) is the quality of maintenance of every kind--yearly scheduled, preventive, emergency, etc. Maintenance here differs radically from that in any other enterprise whatsoever. For example, the type and amount of maintenance work are determined and approved with the mandatory participation of representatives of the chief designer. This rules out the possibility of overlooking any maintenance, however insignificant it may be.

Not only the equipment but also the systems and parts included for maintenance are strictly monitored. A control check is made of the entire equipment, and that by two or three independent methods. With us it is the same as in aviation--as soon as an aircraft engine is [line illegible] it is replaced even though it may still be in excellent technical condition. It is that way with us too, for considerations of security and safety supersede all other considerations. Judge for yourselves--the entire technological process at the power plant is continuously tracked and monitored by three of the most modern, independent, i.e., self-contained, automatic systems. These rule out any subjective decision at variance with the requirements of the technological process. Let me add that in most atomic power plants in the West there are only two failsafe systems.

[Question] And still, Comrade Dichev, the conviction is ingrained in some people, even those with an engineering education, that harmful gases and polluted water are discharged by atomic power plants.

[Answer] Yes, there is such a conviction. It is due to the fact that very little has been written on these questions in our country. They are almost unexplained to the population. That is why phony opinions spread. Let me, as a specialist and an official, say most solemnly that our power plant discharges no polluted water at all. Why, we regularly go fishing and catch them in the wastewater canal from the power plant. And who knows better than we whether the water is polluted or not? Now for gases. As you have seen, the power plant has several high stacks. But they don't smoke; they are only vent pipes. The radioactive elements that escape via them into the atmosphere range from one-hundredth to one-thousandth of the established health safety norms. Of course, the people don't know this. Nor do they know that the natural background differs in different regions of the country. Around Vitosha, for example, it is higher. Our power plant raises the natural background 0.01. This increase is so insignificant that it cannot be determined with radiation-monitoring instruments and we prove it only with mathematical data, i.e., with theoretical calculations. If there were a thermoelectric power plant with the same capacity at this site, during a 24-hour period it would burn 12,000 tons of coal and pollute the air much more. Incidentally, this fact has been brought out and discussed repeatedly at international conferences. You would do well to talk about these also with Gecho Khitov, nuclear and radiation safety director.

Our conversation with Chief Director Engineer Dichev "delved" increasingly into many important and interesting questions. At least to us they were important and interesting, perhaps because we are accustomed to thinking, talking and writing about them. And these are problems and questions of our times, of our day. We shall talk about some of them in the next article.

[14 Aug 86 p 3]

[Text] 2. A problem with Only One Solution

Our atomic power industry is still small, but already has its veterans. One of these is Gecho Khitov, a physicist. He is the first and the present head of radiation-monitoring research at Kozloduy Atomic Power Plant. His official position now is nuclear and radiation safety director.

"This is the office that was set up first at the power plant," Gecho Khitov told us. "There were 11 of us specialists who were appointed forthwith when the ground was first broken."

During the time the power plant was under construction, i.e., 1969-1973, the specialists measured the natural radiation background in the region. In the measurements, which have been made continuously since the commissioning of the power plant, 12 years by now, only once was an increase in the background recorded--the evening of the First of May 1986. The reasons for this are known --the accident at Chernobyl'. The experienced physicist sees that we have accepted the explanations with slight reservations. This obviously offended him and, assuming a serious mien, he said to us in an official tone. "I declare this most solemnly as head of the special radiation-monitoring research service. Precise and detailed documentation has been kept of all this and is at the disposal of Bulgarian and international inspection authorities."

[Question] Comrade Khitov, lately radiation background is being talked and written about with increasing frequency. This concept has become generally part of our language, but what precisely does it mean?

[Answer] Radiation background is the radioactive state of the environment--air, water, soil. When we say there is no change in the background, this must not be taken to mean that there is no radiation around us. If this happened, deformations would also occur in living organisms, for they cannot do without natural radiation.

Realizing that our knowledge on these questions was next to nil, the specialist physicist began to explain to us in the most everyday language possible that we speak of background changes when the radioactive particles in the environment are present in above-natural volumes. But even this still does not mean that any hazard has occurred. International norms have been established, the exceeding of which create conditions for a harmful effect on the health of humans.

[Answer] But I have already said that the measurements we have now made for 15 years have shown no deviations even of the natural background and that the first and only excess so far is that after the accident at Chernobyl'."

[Question] How did you, as a specialist, cope with it?

[Answer] Calmly, of course, for the elevated radioactivity was in a range that created no immediate threat.

Gecho Khitov fell silent and stopped to think, then glanced at us with a barely perceptible smile.

[Answer] I know somebody will say "Hey, give up on this Khitov. He's protecting his job. That's why he is talking this way." Okay, but what am I protecting--my colleagues and workers eating tomatoes and cucumbers from our greenhouses? Look at them there outside, beside the power plant. We eat cabbage and other vegetables from our garden, too. And they grow, so to speak, under the stacks of the power plant, beside the walls of the very reactors. You will find hardly anybody who will risk his life to protect his official position, however cushy it may be.

[Question] Yes, it is so. We agree, but let us remind you that just the same certain precautionary measures were taken at the beginning of May.

[Answer] And rightly (said Khitov and with wonderment asked), but what of it? When there are data about an epidemic of Hong-kong influenza, don't the health authorities and we citizens ourselves take appropriate precautionary measures? Why does this not embarrass us, but we are shocked by measures against an elevated background? We teach children how to observe traffic regulations, which is a good idea because it is necessary, but why should we not acquire elementary knowledge as well about radiation protection. This is normal and necessary; we simply live in such times.

In one way or another everybody we talked to during our stay at the atomic power plant spontaneously raised this question. The chief director Engineer Dichev, with concrete examples, even pointed out far more insignificant problems on which the broadest and most varied health education is being conducted, but nothing has been done to explain the basic rules of protection against radiation. Even we journalists have been admonished for writing nothing about these things. And we have been asked why.

Why, indeed? In order not to cause social stress? Well and good, but people need such information and when they do not receive it in the standard fashion, they make it up for themselves--and what's more, with the most incredible subject matter, from a pseudoscientific report to local gossip and scaremongering rumor. It is precisely this that creates stresses among the population.

"And mankind has barely entered the era of atomic energy. It has yet to begin to develop it on a maximum scale," Eng. Oved Tadzher, hero of socialist labor, likewise said to us. It is hardly necessary to introduce him--he is our widely known builder, one of the apostles of Bulgarian atomic energy. He is now supervising the construction of power-generating units No. 5 and 6. Why, he was categorical--humanity has no other choice than to use the inexhaustible mighty power of the peaceful atom. The problem of energy, without which life is impossible, is a problem with only one solution--the peaceful atom.

Twenty-six countries now have atomic power plants with 370 reactors, whose capacity is more than 250,000 megawatts. In installed capacity these countries rank thus: the United States, the Soviet Union, France, FRG, Canada and the rest, but in terms of atomic energy's share of total produced electric power the rank order is as follows: France 65 percent, Belgium 50 pct, Finland 41.5 percent, Sweden 39 percent, Switzerland 35 percent, Bulgaria 32.3 percent, etc. As can be seen, France obtains almost two-thirds of its electric power through the atom.

Our country ranks 19th, having laid the foundations of its atomic power industry with the building of Kozloduy Atomic Power Plant. Its four reactors with a total capacity of 1760 megawatts annually pours into our national power system as many billion kilowatt-hours as our country produced in 1967 with all its capacities. It is anticipated that at the beginning of October the tireless peaceful atom will "hammer out" its jubilee 100-billionth kilowatt-hour.

The figure is impressive, but for all that we citizens who are uninitiated in the power industry cannot gauge whether it is a lot or a little. Therefore, dear readers, let us take a known fact and reason a little together. Our First Atomic Power Plant yields 32.2 percent of our total electric power production. This means almost one-third. Now let us imagine what the situation would be if 12 years ago we had not built and commissioned Kozloduy Atomic Power Plant. To prevent the progress of the country, of life at all, from coming to a standstill, we should have had to build at least one more power complex like Maritsa-Iztok. Building is not the problem; the problem is that there is no place, no resources. In our country there is no other coal field even of such low-calorie coal as in the East Maritsa Field. A way out could have been found even in the Maritsa if it had been at least half as deep as the Danube, or if we had had a little bit of Urengoy. But it is well known that nature has deprived us of both and yet the third. Therefore it was most realistic to become oriented towards atomic energy of the atom, as the party and state leadership of our country farsightedly did as early as 1968-1969 when the decision was made to build an atomic power industry.

Can we give up our First Atomic Power Plant? Nothing will be easier than that. The reactors will be shut down and come to a standstill forever; they will turn into useless rusty machinery. But let us try to imagine what this would mean. Most simply stated, every third day we would not have even one paltry kilowatt-hour; not even one bulb in the entire country would light up. Most simply stated, factories and plants would come to a halt; trains in stations and railroads, aircraft on airfields would come to a standstill; houses, villages and cities would be plunged into darkness. Every third day! It is frightful even to contemplate. . .

But let us return to our informants at Kozloduy Atomic Power Plant. Chief Director Engineer Dichev voiced a hypothesis--possibly in 50 years the scientific and technical revolution will find a different solution, for example, producing power in space and somehow delivering it to earth. Or something else. But in his opinion, in 50 years and maybe more the sole solution is atomic energy. And the physicist Khitov expressed his conviction in his own way.

[Answer] For many years (he said to us), I have been in charge of geophysical research in all of northeastern Bulgaria. We have looked for petroleum and gas. We have checked this land of ours centimeter by centimeter, so to speak, to a depth of 1000 and more meters. There is neither petroleum nor gas. Therefore I gave up this hopeless job and devoted myself to atomic energy. That is why we must study and adopt every achievement of scientific and technical progress relating to peaceful use of the atom.

[Question] Could anything very serious, Comrade Khitov, make you renounce, or drive you away from atomic energy?

[Answer] No, nothing! I am devoted to it with a profound awareness, understanding and conviction that I have devoted myself to a great cause, without which human progress will cease. My words will seem much like bombast and slogan-mongering, but I have no way of assuring you of my sincerity other than the fact that I have been here since the first ground-breaking and will remain as long as it is thought that I can work and be useful.

We encountered this conviction among all those we talked to. This is perhaps one of the distinguishing characteristics of the many thousands of staff employees, about whom we shall tell a little more in our next and final article.

[15 Aug 86 p 15]

[Text] 3. People Who Are on a First-Name Basis with the Atom

Actually, they are like all of us ordinary citizens and differ, perhaps, only in the special character of their occupation. They told us how an atomic power engineer is molded, especially out of operational personnel, i.e., the people who "talk" directly to the atom and make sure that it is always obedient. The overwhelming majority of workers at the power plant participated in its construction and assembly, which is the best method for detailed familiarization with the equipment and technology. Many of them have also been to the Soviet Union for training.

"With us it is a law," Chief Director Engineer Dichev explained, "that the reactors and nuclear technology are controlled only by specialists with a higher education. In the West in most cases these positions are filled by technicians who are secondary-school graduates. Moreover, in our case the system of personnel appointment and advancement is far stricter. No entry from the outside, through the back door, no connections or pulling strings.

"For every position here an examination is taken, and that according to a system quite different from the university system. Here one does not draw three from a specified approximately 20 questions, but takes an examination on the entire material, i.e., answers all 20 questions. And another important requirement set for any supervisory position in operational personnel--they must spend a certain probationary period in every workplace that is in the sphere of the supervisory activity in question. An interesting and effective form of continuing training is training exercises every month in which various emergency situations are acted out, including those which are in practice impossible.

We chatted with the party committee secretary of the power plant, Engr Nikolay Videnov. He gave us the following data. The Atomic Energy Combine employs over 3000 people in operations alone. Party members number 629 manual workers, specialists and office workers, of whom 509 have a higher education. Party membership cards are soon to be delivered to 20 newly admitted members.

"The work of our people has always been distinguished by high discipline, high conscientiousness and self-control," Engineer Videnov explained to us. "Some say that we have been a zone of elevated radiation. This is not true, of course. What is true is that we are a zone of elevated responsibility."

We asked whether there is an instance of a party group or primary party organization dealing with a violation of discipline of a party member or other member of the workforce.

[Answer] No, for the simple reason that there has been no occasion, (replied the party committee secretary). The very character of atomic power production requires two immutable things, absolutely mandatory for everybody: high professional training and high, conscientious discipline. I have also been employed in other enterprises, but I have been here from the start--for 7 years --in operational personnel, i.e., with reactors. I must tell you that in no other enterprise can the discipline be at all compared to the discipline at an atomic power plant.

We also heard a high rating of the personnel operating the reactors of the First Atomic Power Plant from Eng I. A. Dmitriyev, head of the Soviet specialists in operations.

"During the time I have been at Kozloduy Atomic Power Plant, and it is not short--4 years," Igor' Afanasiyevich told us, "I am convinced that a very good, highly skilled workforce has grown up. The personnel running operations have an excellent knowledge of their job, they bear themselves with a strong sense of responsibility for their obligations. Among them there have been built up strong relationships of comrades and colleagues, which for a production process of this type is also important.

"Another fact likewise indicates the growth of Bulgarian power engineers. Many of them are also engaged in very serious scientific-research work.

"One of our workforces received an award from the national competition of RABOTNICHESKO DELO," the party committee secretary Engineer Videnov explained to us. "Another workforce of physicists, power engineers and engineers, headed by Engineer Dichev, had the daring to 'intrude' into the holy of holies of atomic fuel. The workforce is patenting a new method of loading and reloading the core. It is the best development in the world, highly efficient, and ensures great reliability.

We also heard very frequently from Bulgarian and from Soviet supervisors and specialists fine words about the workforce of First Atomic, by now transformed into a major atomic power complex. But even this good, close-knit and disciplined workforce has its problems. Its major concern for the present is the impending commissioning of power-generating unit No. 5 with a capacity of 1000 megawatts. In the opinion of Eng Georgi Stefanov, first deputy chief director responsible for the new capacities, preparation for the commissioning is proceeding normally, but staffing with operational personnel is lagging seriously behind.

"There is a special shortage," he emphasized, " of specialists in electronics and automation, in technological process-control systems."

The Soviet official, Eng I. L. Sapir, viewed the problem with much more anxiety. "This is the most important problem," he repeated several times in our conversation. "We have told the management of the complex that if during the checkup of the knowledge of the personnel we are not convinced of their professional readiness to take over the power-generating unit, we will not sign any document for its delivery into operations."

Izrail' L'vovich explained that more serious still was the problem of repair service for the electronic instrumentation, which he called "an independent activity, and very complex at that." In the data computer center of power-generating unit No. 5 alone, 50,000 electronic units have been installed. At present it is not clear how this complex activity will be maintained, without which operation of the power plant is impossible.

Let us share also some of our personal impressions. The atomic power complex at Kozloduy can indeed, without any exaggeration, be called a zone of high responsibility. And still it must not be left to the special character of the work alone to "inculcate" a sense of responsibility and discipline. The personnel must be worked with constantly, specifically and intelligently. The accident at Chernobyl' teaches us that. For in the long run, whether the atom yields its mighty power peacefully and obediently depends on the people who "talk" to it every minute. But these people are not born ready-made atomic power engineers. They have to be taught, trained, educated. The result is that the personnel problem is not temporary, is not a problem for the commissioning of power-generating unit No. 5 alone. It must be solved from a 15- to 20-year perspective. But this is beyond the powers of the complex's management.

The personnel problem is also closely associated with the social development of the workforce. We must say quite frankly that for the people on whom the normal and reliable operation of the atomic power complex depends and who produce one-third of the country's electric power, there is a shortage of housing, of schools and children's establishments for their children. There is no health-care institution, no modern transportation connecting Kozloduy with the rest of the country. There are very many weak spots and deficiencies in the supply of provisions, in trade and services; little is done in the area of a mass sports program. Is it not a genuine paradox that when we refer to the atomic combine at Kozloduy, it is considered an extremely important enterprise on a national scale, but when we begin to talk about the social problems of the workforce, these are degraded to local significance. Yet it is more than clear that things will not be changed fundamentally with local resources, even of the entire okrug. It will be fair if all okrugs are obliged to shoulder their share, corresponding to the percentage of electric power they use. For everybody uses electricity--every enterprise, institution, school, hospital, every Bulgarian home--just as they use bread.

6474
CSO: 511/3053

HUNGARY

THIRD PAKS NUCLEAR REACTOR TO PRODUCE ENERGY IN A MONTH

Budapest NEPSZAVA in Hungarian 28 Aug 86 pp 1, 4

[Article by Jozsef Hazafi: "Robot Installs Enriched Uranium; Physical Start at Paks Block 3; New Reactor Block Will Produce Energy in a Month"]

[Text] The physical start-up of the third block began yesterday at the Paks Nuclear Power Plant; the fuel elements are being loaded into the reactor.

We are standing here on the podium, an arm's length from the reactor. The robot, made by Ganz-MAVAG as prime contractor, has already begun installing the fuel of block number 3.

The reactor area is an area strictly sealed off from outsiders. "Not because it is dangerous," explains our guide, department chief Istvan Andics, "because fresh fuel does not radiate. The ban is because we must create extraordinarily clean conditions when loading the fuel."

The Soviet and Hungarian experts working above on the reactor podium are in buttonless snow white gowns, no rings on their fingers or chains on their necks. Those who wear glasses have their glasses secured with a cord. Enormous damage could be done if foreign materials were to get into the reactor container. They would have to dismantle the equipment built in or loaded thus far and the work could not continue until they found the object--ring, pencil, screw driver--which dropped in.

One sees that the people working on the podium and guiding the loading are talking more than they are working.

"Every operation can begin only if the Soviet and Hungarian experts come to an agreement in every question. Then they log the beginning of the task, check that the fuel cassette goes into the proper place, and only then start talking about the next operation," Istvan Andics says.

We could also experience the circumspection on Tuesday when the government committee of the Paks Nuclear Power Plant met under the leadership of Laszlo Kapolyi. After the report by Jozsef Konya the committee reviewed the experiences thus far with the operation of reactors 1 and 2 and listened to Karoly Szivos, the director of EROTERV [Power Plant Designing Enterprise], who reported on the preparations and planning for the construction of the two 1,000 megawatt reactor blocks. Following this there was a meeting of the start-up and control committee of the nuclear power plant. It reviewed the placing into operation of block number 3 and checked the issuing of the necessary permits and certificates. After the circumspect work the committee gave permission for the physical start-up of block number 3. Even then the committee set a few conditions, which were met Tuesday afternoon and night, then yesterday morning at 9:55 the final permission to load the fuel came from Budapest.

Only then could the robot loading the fuel begin work in the reactor hall. Forty two tons of moderately enriched uranium in a total of 312 fuel cassettes go into the reactor.

There is 4 meters of fuel in the six-sided cassettes, which are more than 6 meters long, but the enrichment is not the same in every cassette. So a special plan had to be worked out and fed into the robot as to which cassette went where. The equipment will be producing one month after the physical start-up.

"Very much is said today about safety. What will guarantee, here at Paks, that everything will go exactly right?

"In the first place the start-up and control committee checks every operation through the Power Inspectorate, as the supreme authority. In the second place, when we are done with the fuel loading, people from the International Atomic Energy Agency in Vienna will check us."

In the control room of block number 3 we could convince ourselves of how strict the restrictions are. The nuclear protection system operates from the first moment of the physical start-up.

Even though, as we wrote above, there is no nuclear radiation then.

Block supervisor Sandor Szucsan is already watching these instruments.

"The measuring systems are working as if the block were already producing power," he says.

An operational test is being made on the block computer and process control system developed and built by the Central Physics Research Institute, the Electric Power Industry Research Institute and the MMG Automatic Works.

"An agreed upon work program was completed a week ago. This represented an official test of the machine," says Sandor Molnar, operating chief of the computer.

"This is the first Hungarian made computer at Paks. How does the user feel about it?"

"Friday night we subjected the computer to a big security test. We produced a simulated breakdown and watched to see if even in this case it was capable of swiftly and precisely processing all the data, providing appropriate information to the operating personnel. We established, together with the Soviet experts, that the computer was suitable for service during the physical start-up."

Meanwhile in the reactor area the first fuel cassette has gone into place. The robot transferred the first cassette from the storage area into the resting basin and then from there placed the fuel into the reactor according to the proper coordinates. The work goes on 24 hours a day without interruption so that in 5-6 days the well adapted and practiced staff of the Paks Nuclear Power Plant can work on the next phase of the physical start-up.

8984
CSO: 5100/3053a

ARGENTINA

NUCLEAR SAFETY EXPERT SOUNDS ALERT, CITES EQUIPMENT OBSOLESCENCE

Buenos Aires SOMOS in Spanish 24 Sep 86 pp 4-10

[Article by Carmen Maria Ramos; reports provided by Carlos Revello (Cordoba) and Adriana Siero (United States)]

[Text] Could what happened in the Soviet Union happen here? An expert's report reveals some major weaknesses in the safety systems at the Atucha Nuclear Power Plant. The situation at Embalse, the dangers, and what officials have to say about this [are reported here].

The memory of Chernobyl is still too fresh for a report which uncovers safety defects in one of the nuclear plants operating in Argentina to be brushed aside. At the time of the Soviet nuclear accident last March, many people were beginning to ask if something similar could happen in Argentina's nuclear power plants.

An inhouse document--report no 94/86 of 26 March 1986--by the CALIN [Advisory Committee for Licensing Nuclear Facilities] which was leaked to the press in early September has revived these fears.

The report bears the signature of one of CALIN's members, Rodolfo Touzet, a veteran CNEA [National Atomic Energy Commission] expert, vice chairman of CALIN, and head of the department which oversees the application of safety regulations at both Atucha I and Embalse, the two nuclear power plants operating in Argentina. The author of the report sounds an alarm, warning that safety problems--in his view--may be going beyond the limits of what can be tolerated.

The Atucha Nuclear Power Plant first opened in 1974, so it has now completed 12 years of operation. Even though to date its safety record has been excellent, it is now considered a mature plant; this means it is approaching the midpoint of its usable life, estimated to be 30 years. Therefore, not only is it undergoing the natural wear and tear of its normal operation, but in addition, many aspects of its design have been rendered obsolete by technological advances. This means that if Atucha were built today, many of its safety systems would be different and would incorporate new resources to make the plant more reliable, and to decrease risks to its workers, to the population, and to the environment in general.

The Report

The document prepared by Touzet--14 business-sized pages typed single space, plus five appendices containing lists of the sources consulted--is not an alarmist document. But reading it is, to say the least, disturbing. Over and over in the text, we find that the situations described have no solution unless indepth measures are taken. Among the most important problems cited are:

a. In many instances, the level of training of the staff operating the plant is less than what is required. Five years ago no training courses were given and as a result, many jobs related to the plant's safety and requiring formal licensing from CALIN are vacant. In particular, there is a lack of training in dealing with abnormal situations (read "accidents") and in maintenance (this means prevention). The latter, according to some sources consulted by SOMOS, could be related partly to the low salaries and to decisions not being made about assignments and promotions.

b. At the Atucha plant there is a chronic shortage of key parts which hinders preventive maintenance. The computer which monitors the plant's maintenance is an obsolete model, for which parts are no longer being made. Because of its age and natural wear and tear, it has become harder to keep it in full operation. This has already caused a number of incidents, which have led to its compulsory removal from service.

c. There have also been failures in the emergency electrical power systems, without which the plant could not be controlled in case of an accident. Part of this deterioration was caused by the fact that the plant has been pushed beyond the manufacturer's recommended limits.

d. The plant's operating license requires a quality control program ensuring that the technical characteristics of the plant's components are maintained constant from the time they first begun to operate. The start of operation is authorized because the plant meets a series of requirements. If these requirements cease to be met, the plant should then cease to operate. This program has not been carried out at Atucha. As a result, there have been failures in control and instrumentation, which in other plants have led to some significant operational incidents in 1984 and 1985, causing overexposure to radiation or compulsory shutdowns. At Atucha I some work-related accidents have taken place which are related to this situation.

Is a Control Group Needed?

The DCN [Division of Nuclear Power Plants], which is directly responsible for Atucha I, has to date not complied with the requirement of setting up an independent control group with its own engineering capability (calculations, plans, procedures, tests, controls) to ensure that the plant's operation will be safe.

Something the report does not say is that a similar situation led to the accident of the RA-2 experimental reactor at the Constituyentes Atomic Center in 1983 in which its operator, Osvaldo Rogulich, died from overexposure to radiation. In that case there had been a certain relaxation of the safety requirements for the operation of an experimental reactor; this was found to be a factor among all the causes of the accident. The comment was made that if there had existed a control authority outside the CNEA, the situation might have been different.

Later the report lists a series of incidents--which could have led to accidents but which were prevented in time--in the following nuclear power plants: Tihange-1 (Belgium); Krsko (Yugoslavia); Borsele-2 (Holland); Loviisa-1 and 2 (Finland); Salem-1 and 2 (United States); and Tricastin (France). All of these incidents could happen at Atucha I under the present circumstances. The report emphasizes the need to bring the Atucha I plant up to date to prevent the occurrence of such episodes. The report backs up this need by enumerating and describing seven incidents which occurred between November 1984 and March 1986, five of which caused a forced shutdown of the plant. One included the breakage of fuel elements inside the reactor with a loss of uranium pellets. Another exposed repair personnel to high doses of radiation, and a third revealed that the emergency electrical systems were not working.

In a number of these cases serious procedural defects were revealed, such as making repairs without informing the control room personnel, or executing repairs without formal orders or the required supervision.

Although it should not be inferred from this that what happened in 1979 at Three Mile Island in the United States (at TMI a huge hydrogen bubble formed inside the plant, which fortunately did not explode) or the explosion at Chernobyl will necessarily happen at Atucha I, we have to learn from those experiences. In both cases, the accidents began with initiating events similar to those which have already occurred at Atucha I. They happened because safety regulations were overlooked through negligence, because the job had become routine, or through a lack of knowledge on the part of the operators.

The Nuclear Syndrome

One thing is clear: the world's awareness was heightened after the explosion of the Russian reactor, the first in the world to produce radiation victims. The West Europeans were strongly affected. The words of the Nobel Prizewinner in physics, Carlo Rubbia, did not greatly reassure the Italians about the potential dangers of nuclear energy--i.e., the possibility that a plant may explode and release huge amounts of radioactivity: "al-Qadhdhafi, or crossing a street without paying attention are much more dangerous. The probabilities of sudden death from irradiation are less than 1 in 10 million," he declared. Even so, the Italians did not feel at ease.

"Among the questions being asked in the nuclear debate after Chernobyl, one of the foremost is the need to discuss the control of such activities by all of society," an expert in this field, the scientific journalist Julio Orione, told SOMOS. "This means that the republic's ability to decide what is beneficial for the community and what is not must be exercised fully. This takes place by means of an analysis of the economic and technical advantages of different systems of producing energy, and also through a study of the risks to health and the environment--and to survival."

According to Orione, in the case of the Atucha report, the CNEA should not have taken the position it did. "If the report exists and the risks of Atucha's operation are real, this should not have been concealed. Doing so only lends support to the notion that the nuclear field is a place filled with mysteries and dangers to which ordinary mortals only gain access when an accident happens. And then it is too late," he concluded.

The topic of safety--say the experts--is a technical-economic issue. It is a problem of relative cost. An absolutely safe plant would be economically unviable. What is at stake is obtaining a level of risk compatible with other risks accepted by society: automobile and plane accidents, industrial accidents such as Bhopal, natural disasters (earthquakes, lightning). The risk level accepted in the nuclear industry is much lower than in other industries, but even so it does exist. There are 350 reactors in the world--including old and new reactors and those now under construction--and thousands of accumulated reactor-years. Nuclear proponents argue that only one fatal accident has occurred (Chernobyl) and three serious but not fatal accidents: Three Mile Island and Brown's Ferry in the United States and Windscale in Great Britain.

What People at Atucha Say

"I will tell you only one thing: at this time the CNEA is analyzing the construction of the fourth nuclear plant. They have to decide whether it will be a pressurized reactor like Atucha, which is a German model, or if it will be a pressurized pipe design like Embalse, which is a Canadian model.

It seems to me to be quite a coincidence that just now a document which, by attacking Atucha, casts doubts on the German model, has been leaked to the press." This comment was made to SOMOS--with a request for anonymity--by a person responsible for operational safety at Atucha.

According to the engineer Alfredo Fernandez Franzini, manager of Atucha, the report by a CALIN member on the plant for which he is responsible is "a very respectable and even healthy point of view." But he does add one clarification: "The problem is that it was released to the press as if it were the court's verdict, and not an allegation by the prosecuting attorney. And to this charge, which I feel is filled with generalizations, I respond by saying that Atucha has all its safety systems operating up to date, as they were designed, and as they began to operate when the plant first opened. Today we continue to operate under those conditions."

He then cited a few examples.

a. About the personnel shortage, I can say that of the 63 jobs that are licensed at Atucha, I have covered 98 percent of them.

b. Nor is it true that the total accumulated experience of the staff has been reduced by half. When Atucha began to operate, as it was the only center we had, it had 300 percent of the people it needed. Afterwards, as new projects were undertaken, it began to transfer its people and its experience to them. Atucha was to some extent a school. So while at this time I have 150 percent of the people I need, I still have a surplus of 50 percent to operate the plant safely.

c. About the issue of parts, the chairman of the CNEA, engineer Alberto Constantini, revealed that he had requested from President Alfonsin a supplemental appropriation of $3 million to purchase parts. Franzini said that "up to the present time, I have never lacked a part for the plant. Furthermore, a spare part makes the plant operational, but does not affect its safety. The problem would arise if we had no parts to repair safety systems. In that case what I would do is shut down the plant. If we wanted to have a scheduled shutdown now, which means stopping the plant and conducting a safety inspection, at this moment we do not have the necessary parts available. But they are on order, and the first parts will arrive in December. We have planned a scheduled shutdown for March 1987."

The Devil's Advocate

A red alert has been issued for Atucha. But the necessary question now is: what is going on at Embalse? The 600-megawatt plant began to operate in September 1984, and was halted for the first time in March of this year. The reason for this shutdown is that a pinhole had been found in one of the 3,500 pipes of one of the steam generators making up the reactor's coolant system.

This is a fully predictible equipment failure: between 45 and 50 percent of all reactors have one such problem each year.

The engineer Eduardo Diaz, manager of the Embalse Nuclear Power Plant, spoke with SOMOS about how its safety systems are working:

[Question] What happens if the plant's entire computer power fails, for that is the real heart of the central control of the facility?

[Answer]A second identical computer automatically goes into operation. It is constantly recording everything, even while it is inactive.

[Question] What if the electricity supply is cut off?

[Answer]The computers have systems which are independent of each other, and automatic generators which are independent of the plant.

[Question]Despite all this, what if both computers should fail to operate?

[Answer]In that case, the entire plant, including the nuclear reactor, would start to shut down gradually until stopping completely in what we call a secure position.

[Question]What if there is an earthquake?

[Answer] The building has an anti-seismic design and the reactor's containment facility was built of pure cement with walls 1.20 meters thick. Embalse is an area of light seismic activity. It would take a catastrophic earthquake to destroy the reactor building.

[Question] What if one of the electronic systems used to detect problems should fail?

[Answer] All the systems and all the sensors are redundant, and in some cases, they have triple redundancy.

[Question] How do you know that the redundant and triply redundant systems will operate properly when they are needed and will not be as useless as a punctured spare tire?

[Answer] Because we check them every day.

In addition, the chairman of the CNEA, engineer Alberto Costantini, joined in the stir created by the CALIN report, stating: "There is no danger presented by the safety conditions at Atucha I; the plant will not be shut down." Quite a few observers recalled that the CNEA has just won a long battle for its survival, after several years of budget cuts and political delays. Its major enemies in the radical government have fallen by the wayside: Bernardo

Grinspun, when he was at the ministry at the economy; Conrado Storani, when he was head of the department of energy; and German Lopez, former secretary general of the office of the presidency. At the same time, the lack of foresight and the nonfulfillment of their programs by other energy subsectors, combined with the water shortage in El Chocon and in Salto Grande, about 12 months ago made nuclear energy the lifesaver of the SIN [National Interconnected System]. The two plants have been operating beyond their normal power at the SIN's request in order to prevent blackouts. This has been in part the cause of Atucha I's problems. But at the same time, it seems to have given the CNEA more leverage in the government, so that it has finally won authorization to build two more power plants in the future.

Elias Palacios, director of radiological protection and safety at the CNEA, told SOMOS: "If we were not convinced that we need nuclear energy and that the benefits we can derive from it outweigh the risks to which we are subjecting ourselves, we would never accept it." According to Palacios, its justification lies in the fact that if Argentina were to use all of its hydroelectric power available from now until the end of this century, that would provide just 0.6 kilowatt per inhabitant. But only beyond levels of 1 kilowatt is it estimated that countries can attain decent standards of living, while the developed countries consume 2, 3, and even up to 5 kilowatts per capita. "For the time being, we can only increase our energy generation by using nuclear power."

When all is said and done, could an accident happn in the Argentine nuclear power plants? Palacios responds: "Strictly speaking, the answer has to be yes; there are always risks involved in any activity; there are risks in travelling by plane or by car. In our case, we believe that every precaution has been taken, and that the probability of a catastrophic accident is really extremely remote."

Measuring the Environment

Does radioactivity threaten the life and ecological equilibrium of areas near nuclear power plants? Despite all the precautions and safety measures taken at each plant, there are extra backup methods used to check this. Among other duties, this is the job of the CNEA's radiological protection and safety service, whose labs are located at the Ezeiza Atomic Center. There, periodic samples are sent of elements from the environment: from rainwater, from fish in the area, from riverwater, from milk--a good way of measuring iodine in the environment is to analyze the thyroid gland of cows, since iodine concentrates in the thyroid, and cows graze over large areas of pastureland. Each of these samples is dried and converted into a compact pellet (like bouillon cubes), and is then compared with samples of similar elements taken from other parts of the nation. "The iodine content we see in milk from Buenos Aires is no different from what we see near Embalse or Atucha," engineer Elias Palacios, director of the CNEA's radiological protection and safety service, told SOMOS. "It is more likely that we would detect radioactive material released by nuclear explosions in other parts of the planet than that we might find radioactivity released from our own plants."

7679
CSO: 5100/2007

LEAK IN NUCLEAR PLANT COOLING SYSTEM REPORTED

Two Valves Involved

PY092048 Madrid EFE in Spanish 2010 GMT 9 Oct 86

[Text] Rio de Janeiro, 9 Oct (EFE) -- A water leak in two valves in the cooling system of the Angra I nuclear reactor is keeping the plant technicians on alert because of the possible risk of radioactive contamination. This was ccnfirmd by Xamuset Bittencourt, executive director of the National Commission for Nuclear Energy [CNEN], who said the incident "entails no further risks for the safety of the personnel."

The leak, which began on 3 October but was not announced until today, was caused by the rupture of the security rings of the auxiliary circuit of the system. These rings are the same type used on the U.S. space shuttle Challenger which failed to work properly causing the disaster on 28 January. The rings are large specialized parts, which are used at the joints of the water, steam, gas, and oil pipes in the system. These rings are also used in conventional generating plants.

Bittencourt explained that the problem occurred during a preliminary test, and that "in a nuclear plant, it is a good thing it happened at this early stage, when greater danger can be prevented."

Furnas Centrais Electricas S.A., the company responsible for the plant, has ordered an evacuation of the sector. However, it is still not known how many workers were near the place when the incident happened.

Leakage Not Radioactive

PY092335 Brasilia Domestic Service in Portuguese 2200 GMT 9 Oct 86

[Text] Mines and Energy Minister Aureliano Chaves today said the problem that occurred on 7 October at the Angra I nuclear plant was minor. Chaves said a valve stop [retentor de valvula] suffered a short circuit, which did not affect the main system of the plant. Therefore, there was no danger of radioactive leakage. This is because the plant has not been operating since January.

Camilo Penna, president of Furnas company has distributed reports about the 7 October incident at Angra I. According to Camilo Penna, a valve of the reactor's cooling system was defective, causing a small water leakage in the drainage tank. The official message also explains that this type of leakage is possible in any industrial installation. Moreover, it remains confined within closed systems, and thus does not represent any danger.

Angra dos Reis Mayor Jose Luis Ribeiro (Reseque) explained: There has not been any sort of radioactive leakage to endanger the environment at the Angra I plant. This fact has already been confirmed by the National Commission for Nuclear Energy [CNEN].

/9716
CSO: 5100/2014

UNREPORTED NUCLEAR PLANT LEAK 'VIOLATES' TREATY

PY110146 Madrid EFE in Spanish 1815 GMT 10 Oct 86

[By Edgar Hernandez]

[Text] Rio de Janeiro, 10 Oct (EFE) -- The water leak in a valve of the refrigeration system at the Brazilian Nuclear Plant Angrea 1 was not reported to the Argentine Government as it should have been under bilateral agreements that were signed recently. Experts said today that the Brazilian Government has thus ignored agreements in the nclear sector, under which the two countries are required to exchange information in any case of accident at a nuclear plant. The Argentine Embassy in Brasilia has said it did not receive any official communique from the Brazilian Foreign Ministry.

Brazilian physiciast Rogeiro Cerqueira said that Brazilain officials are trying to play down the accident, and pointed out that dismissing the importance of the accident reveals a lack of perception of its gravity.

Meanwhile, Jose Eduardo Leme Salvatore, Director of the Reactors Department of the National Atomic Energy Commission (CNEA), maintains that the leak ws not an accident, but an "operational problem." Leme Salvatore explained that the leak occurred in the auxiliary cooling system, which in only slightly contaminated with radiation from the main system to which the auxiliary system is connected. Leme Salvatore stated that the water contamination level was very low, and that similar leaks have occurred 10 times since 1979, when the first tests were conducted.

The accident occurred on the night of 30 September, when valve 8073b failed, causing nearly 1,000 gallons of contaminated water to spill. The Angra 1 nuclear plant is located in the municipality of Angra dos Reis, 154 km from Rio de Janeiro. Its population of 71,000 people was alerted to the accident 9 days later, which elicited protests from politicians and ecologists throughout the country. Angra doe Reis's climate is one of tension because of disagreements between the plant scientists and other experts.

Nuclear Plant Chief Pedro Jose Linns said that neither the nearby population nor the workers at the plant have been exposed to radiation dangers. In turn, the Attorney General of Rio de Janeiro State, Joao Batista Petersen Mendes, has sent a note to the officials of the Furnas Centrais Eletricas Company, requesting that information and an explanation of the leak be submitted within 10 days.

The Angra 1 Nuclear Plant has been shut down for 277 days for testing purposes. Yesterday, the Federal Appellate Court (TFR) authorized the resumption of plant operations, alleging that the shutdown is causing more than $50 million in economic losses.

/9274
CSO: 5100/2017

NUCLEBRAS GETS FUNDS TO OPERATE UNTIL MARCH 1987

PY120233 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 9 Oct 86 p 38

[Text] NUCLEBRAS [Brazilian Nuclear Corporations] President Licinio Seabra said yesterday that with the 1.66 billion cruzados to be disbursed this week, the corporation will be able to operate until March 1987, meeting its commitments to pay foreign debt service, contractors and suppliers, and operation costs.

NUCLEBRAS now has overdue debts totaling 400 million cruzados, and practically all its activities have been discontinued. Seabra said that by March 1987 he expects to be able to work out the planning Secretariat (SEPLAN) and the Finance Ministry a multiyear budget for the Brazilian Nuclear Program. This multiyear budget, which President Sarney approved in August, will prevent critical situations like the one NUCLEBRAS now faces.

Under the new multiyear budget, all the projects related to the Brazilian Nuclear Program will be rescheduled. Construction of the Angra II nuclear plant is currently the only project that is under way, although at a rather slow pace. This project will have to be accelerated if the ELETROBRAS [Brazilian Electric Power Companies] Expansion Plan is to meet its target of bringing the Angra II nuclear plant into operation by mid-1992. The Angra III nuclear plant project is at a standstill, as are the uranium enrichment plant in Rezende, Rio de Janeiro, and the uranium concentrate (yellow cake) manufacturing plant in Pocos de Caldas, Minas Gerais.

/8309
CSO: 5100/2018

BRAZIL

NUCLEAR, MISSILE, SUBMARINE DEVELOPMENTS SURVEYED

Hamburg DER SPIEGEL in German 25 Aug 86 pp 107, 108

[Unattributed article: "We Make It Ourselves. Emerging Power Brazil Is Secretly Planning Powerful Items: Atomic Bomb, Nuclear-powered Submarines, Nuclear Missiles"]

[Text] Cattle breeder Dario Cardoso complained, saying: "I went into the primeval forest because I wanted some peace and quiet. Now I find out that I was never before so close to the noise of hell." For only 130 km from his farm in the south of the state Para the Brazilian military is allegedly planning the explosion of its own atomic bomb--such is the fear of Cardoso and many, including competent, Brazilians.

How far along emerging power Brazil is with building the bomb is at present the greatest secret. "Brazil preparing nuclear test site"--these vague headlines alone in the daily newspaper FOLHA DE SAO PAULO last week caused the generals to make vehement denials, led the president to hold an urgent meeting with his ministers, and caused numerous physicists to warn of Brazil's nuclear armament.

As a matter of fact, the Brazilian air force has had several tunnels built, including one that is 320 m deep and 1 m in diameter, at a base concealed deep in the forest near the Serra do Cachimbo (mountain range). Nuclear physicist Luiz Pinguelli Rosa of the National University in Rio de Janeiro says that "that is adequate for a nuclear test." Most underground tests in the United States in the 1950's and 1960's took place at a similar depth.

The military does not at all deny the fact that nuclear items are being planned. Admiral Jose Maria do Amaral Oliveira, chief of the armed forces, stated that "in the future, storage facilities for nuclear waste will be created there." Yet he did not reveal exactly how these tunnels, which are equipped with thermal insulation will be used.

For years there have been rumors among scientists about the construction of a Brazilian atomic bomb which is supposed to be ready for testing at the beginning of the 1990's. The country's civilian nuclear program can hardly make any contribution to this because of the strict international controls. The uranium enrichment plant which was acquired from Siemens subsidiary

Kraftwerk Union has so far not become operational. Brazilian physicists call it "nuclear scrap metal."

Since about 1981, the military has been operating a parallel nuclear program which is to result in military use of nuclear power. Like the Argentinians, who already control the fuel cycle and are about 5 years ahead in the nuclear race, the Brazilians are seeking to acquire the "critical technology" free of controls.

They are getting closer to achieving the uranium enrichment which is necessary for the bomb in two ways: In the nuclear research center of the University of Sao Paulo (Ipen), special centrifuges have been under development; and since 1978 in the air force's Technical Institute in Sao Jose dos Campos, 97 km northeast of Sao Paulo, scientists have been researching uranium enrichment with laser beams for years.

Even very pure natural uranium can produce the explosive material plutonium in a reactor--Ipen has a facility for this. In Ipen's experimental reactors, according to estimates, annually between a few grams and 5 kilograms of plutonium are released. Since 1983 Brazil has been working on developing natural uranium reactors.

The biggest problem with the natural uranium reactor is the heavy water which is used as a moderating agent and which is supposed to keep the nuclear reaction under control. However, physicists are of the opinion that the Sao Paulo electric works has already undertaken production within the framework of its hydrogen energy program.

Overall, the various military research projects do in fact constitute a parallel nuclear program on which probably 2,000 to 3,000 skilled people are working. Leonard Spector, American nuclear expert, said a year ago that "while Brazil is not in a position today to manufacture explosive material in large quantities, it is pressing toward achieving this capability in 5 years." At the end of 1983 General Pires Goncalves had been pleased, saying: "Soon Brazil will be able to produce the bomb."

But whether the new capability will then be exploited is a political decision. There is agreement on acquiring bomb production technology by about 1990. But then one group would like to stop, because having the capability of building the bomb acts as a deterrent.

Admiral Maximiliano da Fonseca, retired, would like to go one step further: "My personal opinion is that we should explode a bomb as a demonstration. But far more important than the bomb is the production of nuclear-powered submarines."

This reflects the shock of Argentina's defeat by England in the Falkland Islands war: Fonseca is still shuddering at the fact that "three English nuclear-powered submarines put the entire Argentinian fleet out of commission, it no longer ventured out of port."

Brazil's bomb research is also supplemented by a missile program which is being pursued in an equally purposeful manner. Brazil sold research missiles--also developed with the help of the FRG--to Iraq as a military version.

In line with the space program of the Centro Technologico da Aeronautica in Sao Jose dos Campos, which is under the command to Air Force General Hugo de Oliveira Piva, a Brazilian satellite is to be put into orbit in 1990. Along with this, there is a second parallel program: an intermediate-range ballistic missile with solid fuel is under development. The daily newspaper O GLOBO was pleased at the beginning of this year: "In 5 years Brazil can have missiles with nuclear warheads."

Brazil's armament is even helped by a space treaty with the PRC. Both countries will be able to close technological gaps by agreed-upon cooperation. Brazil receives Chinese know-how about liquid rocket fuels which it needs for the civilian space program, and about guiding missiles which have civilian and military significance.

In return, China gets the solid fuel which was developed in Brazil. Piva says: "We had to make that ourselves since no one will sell anything like that."

12124/9435
CSO: 3420/59

BRAZIL

BRIEFS

ANGRA I NUCLEAR PLANT READY--Angra I Nuclear Plant Chief Pedro Figueiredo, 41, announced at noon yesterday nuclear fuel tests at Angra I have been completed and only authorization by the National Nuclear Energy Commission [CNEN] is necessary for the plant to resume operations. Leakage of radioactive water occurred at the Angra I nuclear plant on 30 September. The plant has been shut down since January of this year. During the tests the reactor operated at critical power (only 3 percent of its full power) and now that the tests have been completed the reactor has been turned off. However, it will be kept heated and ready to go into operation at any time. Once the CNEN authorization is received, Figueiredo noted, the plant could be supplying electricity within 2 days. [By Marcelo Beraba and Tales Faria] [Excerpt] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 12 Oct 86 p 3] /8309

CSO: 5100/2020

TRINIDAD AND TOBAGO

BRIEFS

NONPROLIFERATION TREATY SIGNING--The Government of Trinidad and Tobago has agreed to ratify the treaty on Non-proliferation of Nuclear Weapons and to sign a basic agreement between this country and the Inter-American Institute for Co-operation in Agriculture. The treaty, which was signed by Minister of External Affairs Errol Mahabir on behalf of the Government in August, aims at discouraging the spread of independent nuclear weapons to more countries. According to a release from the Ministry, the Government supported this treaty on the ground that "although Trinidad and Tobago has neither the ambition nor the necessity to develop a nuclear weapon capability, it cannot be indifferent to the dangers posed by the unchecked proliferation of efforts by other countries to develop that capability." [Excerpt] [Port-of-Spain TRINIDAD GUARDIAN in English 30 Sep 86 p 12] /9317

CSO: 5140/007

INDIA

AEC CHIEF DEFENDS NUCLEAR ENERGY PROGRAM

Bombay THE TIMES OF INDIA in English 11 Sep 86 p 9

[Text] DR. Raja Ramanna, chairman of the atomic energy commission, today launched a tirade against critics of the country's nuclear power programme.

Inaugurating the regional centre for exploration and research of the atomic minerals division at Bangalore University, Dr. Ramanna came down heavily on "muckracking" newspaper reports and comments on the country's nuclear programme not only by some Indians but even by "unknown but mischievous professors from abroad who for some reason or the other got enormous publicity."

Defending the country's nuclear power programme, he said nuclear power was perhaps the cheapest and safest form of producing electricity. Also, they upset the environment the least when compared to hydro and thermal power.

That nuclear power was most promising was evident from the fact that 75 per cent of the total power generated in France was from this source.

In the circumstances, he said: "It amazes me to see that some people in Karnataka and elsewhere seem to be waiting for opportunities to decry the importance of nuclear power, especially when this particular state is suffering so much for want of electricity. Its neighbouring state is benefiting in a big way from nuclear power."

Giving details of the country's nuclear power programme, Dr. Ramanna said generation of power at the Tarapur reactor was as high as 85 per cent. He said the second unit of Rajasthan had been working continuously for about five months. The Madras units were also working satisfactorily though there had been breakdowns which had nothing to do with nuclear power as such.

Instead of appreciating the strides made on the country's nuclear power front, he said, some people were bent on exaggerating "small trips and other minor breakdowns."

He said to publicise the difficulties of introducing nuclear power in this country was a great disservice to the nation.

Criticising of some of the investigative reports appearing in newspapers, Dr. Ramanna remarked: "How this investigation is done is not clear because I find many half truths and false information in these so-called investigative reports."

Reacting to the charge that the Dhruva reactor was a total failure, he pointed out that it was a research reactor for which new types of assemblies had to be designed and tested and the best configuration of fuel elements obtained. "Dhruva is the only one of its type in the world and certainly among the largest. Smaller reactors have taken three to four years to go to full power, but we expect full operation in a few months."

AMERICAN PROFESSOR

Referring to Prof. Gary Mihollin's comments on the country's heavy water programme, which appeard in today's newspapers, Dr. Ramanna, who was the architect of the country's first nuclear explosion at Pokhran in 1974, charged: "It seems that this American professor would want us to believe that we have secret dealings with every other country in the world to get heavy water except that which we are producing ourselves in quantities.

Dr. Ramanna said the heavy water plants at Baroda, Tuticorin and Kota were working successfully. Instead of reporting on the success of our own scientists, a small fire which occurred at Talcher was given undue publicity, he added. Repairs to this plant were almost complete and it would be operative next month.

/13104
CSO: 5150/0019

REVIEW OF 'YEAR OF TRIALS' FOR ATOMIC ENERGY DEPARTMENT

Bombay THE TIMES OF INDIA in English 16 Sep 86 p 8

[Article by K. C. Khanna]

[Text] CHERNOBYL has shaken the world's nuclear scientists as nothing else since man first learnt to harness the atom to the tasks of development. In India, at least a third, if not a good half, of the scientific manpower engaged in R & D is working full-time for the department of atomic energy. It would have been abnormal if this huge community had remained immune to the fall-out of self-doubts from the Chernobyl disaster that assails its peers overseas. Indeed, its unease has been vastly compounded by three other factors that have of late hit the country's atomic energy programme: technical failures, persistent delays and that familiar bugbear — shortage of money.

Altogether 1986 has so far been a bad year for the DAE. After a fairly good run during 1985, the first unit of the Madras Atomic Power Station (MAPS) suffered a four-month outage till the beginning of August. Shortly afterwards a fuel rod assembly stuck in the transport system outside the reactor and the second unit of MAPS had to be shut down. The department is still baffled by the daunting problems posed by the stricken first unit of the Rajasthan Atomic Power Station (RAPS). Meanwhile, its two new nuclear power reactors abuilding at Narora have been further delayed by at least 15 months. Nor has its very first nuclear power station at Tarapur (TAPS) worked satisfactorily since 1977-78. In fact, the capacity of its two units was officially derated in April 1985, from 210 MW each to 160 MW, ironically shortly after the constraint on securing adequate enriched uranium fuel for it was gone. France had replaced the United States as the supplier under a trilateral agreement a few months earlier.

In A Mess

That is not all. The DAE's programme for the production of heavy water is still in a mess. The plant at Talcher is virtually a dead loss. The performance of the Baroda and Tuticorin plants is said to have "significantly improved", but it is still nowhere near the designed or even the derated capacity. The effective capacity in Baroda will only be realised, on the DAE's own showing, during 1987-88. Whether the inventory of indigenous heavy water will suffice as and when the eight new units now under way are ready for commissioning thus remains a moot point.

The DAE's long-term plan for creating 10,000 MWs of capacity for the generation of nuclear power by 2004 A.D. critically depends on its ability to design and commission the first two of a series of 500 MW reactors by 1995. To be able to do so, it needs nearly Rs. 500 crores during the current plan for procurement of the requisite materials and advance action. Due to the shortage of resources, however, the Planning Commission has allocated only about Rs. 210 crores for the purpose and suggested that it can raise the balance by floating bonds in the capital market once it is turned into a commercial corporation. How precisely the time and cost overruns in the implementation of the various nuclear power projects will affect the new corporation's financial viability is yet another question mark. As things are, there is not the slightest chance that it will be able to attain its targets and account for 10 per cent of the total electricity generation in the country early in the next century. Not too long ago, nuclear stations accounted for about three per cent of the aggregate capacity; today their share has slipped to just about two per cent.

To what extent the new concerns for safety will add to the costs of nuclear power is again uncertain. The Chernobyl disaster has led to a good deal of activity in the department but so far it has yielded little of substance. The Atomic Energy Commission (AEC) has appointed a task force to prepare a report and the Nuclear Power Board has set up a parrallel committee to cover the same ground. A three-man delegation was sent to the "post-mortem session" convened by the International Atomic Energy Agency in Vienna recently.

Cheapest & Safest

But even before these experts had got into stride, Dr. Raja Ramanna, the chairman of the AEC, had insisted that "nuclear power is the cheapest and safest". And he specifically ruled out the possibility of a Chernobyl kind of accident in this country for three reasons. The Russian reactors are designed to use ordinary water as a coolant and graphite as a moderator. Apart from being highly inflammable by itself, hot graphite in contact with water breaks it into its two molecules — hydrogen and oxygen — and thus increases the fire hazard manifold. Indian reactors, in contrast, use heavy water as a moderator which acts as a "heat sink". Secondly, the new generation of Indian reactors (from Kalpakkam onwards) are all housed in a double containment — a room within a room. An accidental escape of radio-activity into the atmosphere is, therefore, almost impossible. Finally, Indian operators, unlike the overwhelming majority of operating personnel overseas, have a reverential attitude towards atomic energy; being trained scientists, they are more aware of the costs of negligence or human error.

The candid report by the Russian delegates in Vienna, by and large, bears out Dr. Ramanna's assessment. They have frankly acknowledged that the unique design of the reactors is accident-prone. They have also admitted to at least six major and deliberate violations of the stipulated safety procedures at Cheronbyl — something against which there cannot possibly be any defence. Nor is it a secret that the Indian nuclear power stations are much more automated than the Russian plants which need greater human intervention to run them. In India every shift is manned by at least five graduate engineers licensed for the job after elaborate training and tests. It is unclear whether the "foreman" in operational control of the Chernobyl plant at the time of the accident was equally well qualified.

Even so, Dr. Ramanna has said that additional safety measures will be taken once the lessons of Chernobyl are learnt. After the 3-Mile Island disaster, the DAE had installed an extra pump to take over in case the auxiliary boiler feed pump fails. Besides, instrumentation panels were changed to ensure that the operators have quicker and easier access to the relevant information in an emergency. In the newer plants (from Narora onwards) an emergency control room, independent of the operational control room, is being set up and it will be manned round the clock. All this will add about two paise per unit to the cost of nuclear power but the expense will be well worth it.

This apart, the problem of decommissioning its older and derelict plants stares the DAE in the face. In another decade or so, TAPS will have to be taken off the line; it has already been operating for nearly 17 years. An edge of urgency to the exercise has been further imparted by the possible fate of RAPS-I. Right from 1972, when it attained criticality, it has seldom been able to deliver full power; by March, 1982, it had suffered as many as 251 breakdowns. Some of the longest of these unscheduled outages were caused by repeated failure of the rotor blades of its imported turbo-generator, leakage of heavy water and labour trouble. On February 1, 1985, it was synchronised with the grid after a lapse of nearly three years that the DAE took to repair new leaks in its end-shield. Within four months, however, the leaks reappeared elsewhere and since May 20, 1985, the plant has been out of commission once again.

Hard Choice

After so many attempts to rectify it, the DAE has concluded that the end-shield, if not the entire reactor, may have to be written off. The choice is hard. One option is to cut up the highly radio-active 120-tonne end-shield by remote control, remove the pieces, put them in cement concrete containers encased in stainless steel shielding and bury the lot. Another is to remove the fuel elements, pour cement concrete over the rest of the plant and entomb it forever. The third is to remove not only the fuel elements but also the other radioactive components and bury them. Any one of these three projects will cost up to Rs. 40 crores and four years to implement.

So the DAE is also toying with the idea of reducing the quantity of the light water that normally goes into the end-shield and running the plant at lower power. But this course may lead to what is called differential heating and cooling and may be risky. If so, decommissioning may be the only viable alternative. Whichever way it is done, this will be expensive.

It is, however, plain that the additional costs of safety or decommissioning will affect the relative economics of nuclear power much less than design defects or failure of equipment. The two units of MAPS, for instance, can make a tidy profit even after selling power to the Tamil Nadu grid at 43 paise per unit while the generation cost of thermal stations of comparable vintage in the vicinity is much higher: 50 paise to 60 paise a unit. This cost advantage, however, will be severely eroded, if not altogether lost, in case MAPS, like RAPS, is bedevilled by frequent and prolonged outages.

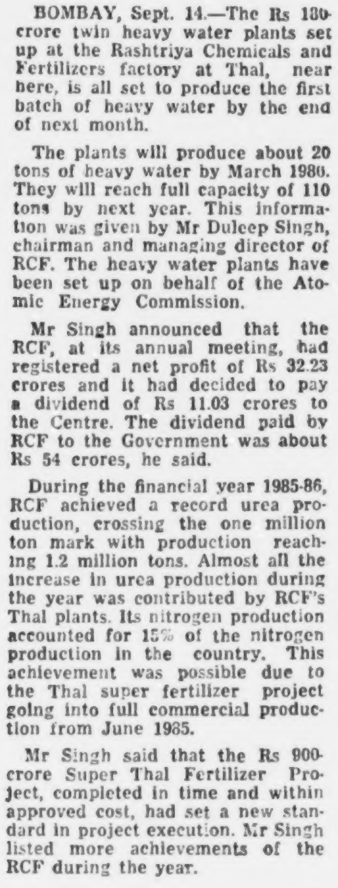
/13104
CSO: 5150/0022

INDIA

HEAVY WATER PLANTS TO REACH FULL CAPACITY BY 1987

Calcutta THE STATESMAN in English 15 Sep 86 p 9

[Text]



BOMBAY, Sept. 14.—The Rs 180-crore twin heavy water plants set up at the Rashtriya Chemicals and Fertilizers factory at Thal, near here, is all set to produce the first batch of heavy water by the end of next month.

The plants will produce about 20 tons of heavy water by March 1980. They will reach full capacity of 110 tons by next year. This information was given by Mr Duleep Singh, chairman and managing director of RCF. The heavy water plants have been set up on behalf of the Atomic Energy Commission.

Mr Singh announced that the RCF, at its annual meeting, had registered a net profit of Rs 32.23 crores and it had decided to pay a dividend of Rs 11.03 crores to the Centre. The dividend paid by RCF to the Government was about Rs 54 crores, he said.

During the financial year 1985-86, RCF achieved a record urea production, crossing the one million ton mark with production reaching 1.2 million tons. Almost all the increase in urea production during the year was contributed by RCF's Thal plants. Its nitrogen production accounted for 15% of the nitrogen production in the country. This achievement was possible due to the Thal super fertilizer project going into full commercial production from June 1985.

Mr Singh said that the Rs 900-crore Super Thal Fertilizer Project, completed in time and within approved cost, had set a new standard in project execution. Mr Singh listed more achievements of the RCF during the year.

/13104
CSO: 5150/0021

NUCLEAR SCIENCE CENTER TO HAVE POWERFUL ACCELERATOR

Bombay THE TIMES OF INDIA in English 13 Sep 86 p 14

[Text] THE newly-established Nuclear Science Centre here will soon be the site of a nuclear particle accelerator, one of the most powerful of its kind in the country.

Financed by the University Grants Commission, and costing about Rs. 75 million, it is to serve as an experimental facility for Indian universities.

The device, called the pelletron, and used to accelerate charged atomic particles to high speeds and study their interactions with other particles and matter, will be ready for use by early 1989, NSC officials say.

Besides helping scientists study nuclear physics, the device will facilitate research in such areas as medicine, material sciences and even archeological dating.

Inside the pelletron, the charged atomic particles, called ions, will be accelerated to high speeds by using an electric potential of 15 million volts making it the most powerful pelletron in the country.

An indentical device but with an accelerating potential of 14 million volts, now being installed at the Tata Institute of Fundamental Research (TIFR) in Bombay, should be ready by the middle of next year, NSC officials say.

Both the NSC and the TIFR pelletrons were bought from an American company and will be brought in parts to India and assembled here.

But the steel tank that encloses the accelerator will be Indian and so will be the tanks for storing a gas to be used as an insulator.

There are other accelerators in the country, but none meant particularly for universities nor do they possess the power that the pelletron offers.

The centre as well as the accelerator will prove invaluable to experimental nuclear physicists in the country, a senior NSC official says.

The pelletron will be able to accelerate a variety of ions ranging from the light hydrogen to uranium-238 than hydrogen.

There are also plans to install another machine called a cyclotron as a booster accelerator at the base of the pelletron.

This device, in which particles travel in circles as they are accelerated, can yield even higher energies than the pelletron.

Through periodic zonal workshops, the NSC officials are already in discussion with physicists about the nature of experiments that may be conducted at the centre.

/13104
CSO: 5150/0020

NUCLEAR WASTE BURIAL GROUND NEARLY COMPLETE

Bombay THE TIMES OF INDIA in English 11 Sep 86 p 12

[Text] INDIA'S most expensive graveyard will be ready to receive its first coffin in a couple of months.

It took eight years and Rs. 200 crores to build the graveyard, a cavernous underground vault made of thick concrete lined with steel.

The unusual cemetery is the burial ground for deadly radioactive nuclear wastes that have accumulated since the country's first nuclear reactor "Apsara" went into operation in 1956.

The Bhabha Atomic Research Centre (BARC), which is very soon commissioning India's first nuclear cemetery, calls it "solid storage surveillance facility (SSSF)".

Located near the Tarapur Atomic Power Station (TAPS), the SSSF's deceptive superstructure hardly gives the impression that it is the repository of the deadliest wastes ever produced by man.

Inside its underground vault are rows and rows of steel tubes that will house the waste canisters dropped by overhead cranes. Heavy steel plugs seal the tubes' openings at the top.

Guarded day and night, the vault is cooled 24 hours a day in a drought of air to carry away the heat given off by the decaying nuclear wastes.

BARC says that SSSF is an interim storage facility that will be under surveillance for 25 years.

After that the coffins will be retrieved and placed in a permanent burial ground — probably an abandoned mine of the Kolar gold fields where bore holes have been drilled and simulation studies are already going on.

Nuclear wastes cannot be dumped in the same way as municipal garbage because of the deadly radiation they emit for as long as 100,000 years.

Before dumping the wastes inside the SSSF vault, they must be "conditioned" so that the coffins do not leak.

The leak-proof coffins are made in multi-million rupee facilities called waste immobilisation plants, one of which has just become operational at Tarapur.

About 250,000 litres of highly active wastes, that have so far been embalmed into coffins, are awaiting burial.

According to BARC, the "conditioned" wastes take up very little space. The wastes from four of India's atomic power plants in one years can be packed inside two large steel almirahs.

The SSSF will only store long-lived and highly dangerous nuclear wastes. A lot more wastes remain in reinforced cement concrete trenches, dug up around nuclear facilities in Rajasthan, Tarapur, Trombay and Kalpakkam.

/13104
CSO: 5150/0018

IRAQ

IRAQI DELEGATE ADDRESSES IAEA CONFERENCE IN VIENNA

JN011437 Baghdad Voice of the Masses in Arabic 1300 GMT 1 Oct 86

[Text] Iraq has called on the IAEA general conference currently being held in Vienna to exert pressure on the Zionist entity to open up its nuclear installations to international inspection and to abandon nuclear weapons. In an address to the conference last night, Dr Rahim 'Abd al-Katal, head of the Iraqi delegation, explained that the Zionist entity continued to build its nuclear arsenal in the past year, either by transferring uranium or by stealing hundreds of electronic instruments used for nuclear explosions.

In his address, the head of the Iraqi delegation said that countries which have used and are still using pressure and threats by suspending their financial and technical contributions to the IAEA with the aim of affecting this conference and limiting its ability to adopt appropriate resolutions should instead put pressure to prevent the leak of materials and information which help the Zionist entity continue to build its nuclear weapons.

Dr Rahim 'Abd al-Katal explained that the IAEA general conference includes sovereign countries which must have equal rights and responsibilities. It should seek to fulfill the people's inalienable right to the peaceful use of nuclear energy.

/9599
CSO: 5100/4505

PAKISTAN

AEC CHIEF TALKS OF PLANS FOR 'A FEW' NUCLEAR PLANTS

Karachi DAWN in English 8 Sep 86 p 9

[Text]

LAHORE, Sept 7: Mr Munir Ahmed Khan, Chairman, Pakistan Atomic Energy Commission, has said that the country will set up "a few" nuclear power plants to bridge the gap between power requirements and availability.

For the time being, Pakistan would have to rely on imported plants but gradually it would be able to make them locally, he said in an interview with *Dawn* here on Sunday.

About the Chashma nuclear power plant, Mr Khan said the chances of Pakistan getting a reactor had brightened following the Prime Minister's recent visit to a number of Western countries. Negotiations were going on with a European country and an agreement would be signed in the near future, he indicated.

According to him, Pakistan would get the reactor without signing the Nuclear Non-proliferation Treaty (NPT) and that the said European country would accept Pakistan's point of view.

Pakistan, he insisted, would not sign the NPT unless India did the same. He said signing of the NPT would be like bartering away national sovereignty. Once Pakistan signed the treaty no other nation would offer protection.

Mr Munir Khan reiterated Pakistan's proposals to India, and said: "We are still waiting for an answer from them." Pakistan, it may be mentioned, has proposed to India that the two countries agree not to make nuclear weapons, inspect each other's nuclear installations and make South Asia a nuclear-arms-free zone.

He said Pakistan could manufacture reactors locally but this required "huge investment and a heavy industrial base," which were not available. He cited the Indian example and said it could make its own reactors in 20 years after getting all drawings from Canada.

According to him, small reactors were more capital-intensive than the bigger ones. He said Pakistan would make research reactors without any foreign assistance but such reactors could not meet power requirements of the country.

If all resources were made available and everything went well, a reactor could be made in about six years, Mr Munir Ahmad said.

IMPORTANCE OF ENERGY: The PAEC Chairman also addressed the Pakistan Engineering Congress in the afternoon, and highlighted the importance of energy for the economic progress of a country. He gave details of the Chernobyl reactor accident and its implications for other countries in general and Pakistan in particular.

To resolve the energy crisis in the country, he stressed the need for making more efforts for oil and gas exploration solving technical problems hindering the use of domestic coal, developing hydroelectric resources and bringing in nuclear technology to reduce pressure on oil and gas resources.

Mr Munir Ahmed explained how the Chernobyl accident took place and said a number of countries had refused to give up their nuclear programme even after the disastrous consequences of the Soviet plant mishap.

He said European countries would exploit the accident for their own interests and in addition to criticising the Soviet Union for lack of precautionary measures, would urge developing countries not to undertake nuclear programmes in order to escape such consequences. Pakistan, he said, would not yield to such "advice" and would continue to pursue its peaceful nuclear programme. He, however, said Pakistan had already adopted a number of precautionary measures obviating possibilities of any such accident in the country.

He said about half a dozen stations had been set up to monitor radioactivity in the country. The Chernobyl accident had slightly increased the radioactivity level in the country but it was well below the permissible limits.

/9274
CSO: 5100/4704

COMMENTARY VIEWS ACCORD WITH CHINA

Islamabad THE MUSLIM in English 20 Sep 86 p 4

[Text]

THE Sino-Pakistan accord on peaceful uses of nuclear energy is a significant step towards extending and diversifying their existing economic ties. While the two countries have been already pooling their experience in the broad field of science and technology, this is the first formal agreement enabling them to launch joint projects in harnessing nuclear energy for solving their manifold social and economic problems. The agreement specifically provides for mutual co-operation in using nuclear technology in industry, agriculture, exploration of nuclear minerals as well as medical research. Of immediate interest will be the possible production of radio isotopes in industry and application of radiation techniques to increase agricultural productivity.

One special dimension of the agreement is that it is perhaps the first serious attempt to promote such collaboration in this sensitive field between two Third World countries often denied access to sophisticated nuclear technology by the developed countries of the North who are anxious to preserve their own monopoly in this field. This accord should stimulate further efforts within the Third World to overcome their limitations in extending the frontiers of science and catching up with the developed world through more intensified South-South collaboration in this area. Pakistan has bitter experience of Western opposition to its legitimate efforts to implement its long-conceived Chashma nuclear project to solve its escalating energy crisis. Let us hope active Sino-Pakistan co-operation will re-launch this project in the not too distant future despite Western resistance and from resources and expertise generated within the Third World.

The monopolists of nuclear technology need not be alarmed by this accord between China and Pakistan because the arrangement is well within the safeguards stipulated by IAEC and specifically forbids either side to transfer nuclear material for military uses. Both sides have made a firm commitment: to restrict their exchanges strictly for peaceful uses. Above all it is a move to reduce their dependence on the reluctant transfer of technology from the rich to the poor world.

/9274
CSO: 5100/4704

PAKISTAN

BRIEFS

SAFETY ARRANGEMENTS AT PLANT--Many measures have been taken to further increase the safety arrangements at the Karachi nuclear power plant. Some of the recommendations suggested by the nuclear safety committee after reviewing the present safety arrangements have been implemented. An IAEA team reviewing safety standards has also described safety arrangements at the Karachi nuclear power plant as satisfactory. [Text] [Karachi Domestic Service in Urdu 0200 GMT 13 Oct 86 BK] /12624

CSO: 5100/4705

COUNTRY SAID SELF-SUFFICIENT IN NUCLEAR ENERGY

MB060712 Johannesburg Domestic Service in English 0500 GMT 6 Oct 86

[Text] The executive chairman of the Atomic Energy Corporation, Dr Weinand de Villiers, says South Africa is self-sufficient to a great extent in the field of nuclear energy and will most certainly be able to meet demands for nuclear fuel in the next 10 years. In a television interview, Dr de Villiers pointed out that South Africa, nevertheless, was like every other country dependent on other countries for progress in technical areas. In the field of nuclear energy development it would be more difficult and more expensive to be self-sufficient if South Africa did not have international cooperation.

Dr de Villiers said that South Africa was prepared to cooperate with other countries, especially Third World countries, to help them in the field of nuclear energy, but this would be subject to guarantees from the International Atomic Energy Agency [IAEA].

Dr de Villiers said that there was skepticism in many other countries about the South African uranium enrichment process despite the fact South Africa had continually reassured the world that its processes would only be used for peaceful means. Referring to the proposal at the congress of the International Atomic Energy Agency in Vienna last week that South Africa's rights and privileges be suspended, Dr de Villiers said that political pressure had been the main reason for the move. He pointed out that South Africa's rights and privileges could not be suspended under the statute of the IAEA, but that rules were often ignored when politics intervened. At the Vienna meeting it was decided that delegates would vote on the measure in September. [as heard]

/9365
CSO: 5100/3

SOUTH AFRICA

OFFICIAL EXAMINES NUCLEAR TECHNOLOGY PROSPECTS

MB070918 Johannesburg Television Service in Afrikaans 1800 GMT 5 Oct 86

[Interview with Dr Wynand de Villiers, executive chairman of the South African Atomic Energy Corporation, on the "Network" program by moderator Kolie van koller -- live in studio]

[Excerpts] [Van Koller] Here in the studio we have the executive chairman of the South African Atomic Energy Corporation, Dr Wynand de Villers. Doctor, good evening and welcome to Network.

[De Villiers] Recently politics has played a very important role in the International Atomic Energy Agency [IAEA], and South Africa encountered more problems.

[Van Koller] Why are we now at loggerheads with IAEA on industrial and strategic interests as far as our nuclear installations are concerned?

[De Villiers] We are not at loggerheads on the issue of industrial and strategic interests. It is through agreement with the IAEA that we are voluntarily abiding by guarantees on the enrichment process so that the world will know it is only used for peaceful ends.

[Van Koller] Next, I would like to take a look at nuclear arms control. South Africa is still prepared to sign the agreement.

[De Villiers] I cannot say what South Africa is prepared to sign. South Africa is prepared to consider signing the agreement, but the nuclear arms control agreement makes provision that if you sign the agreement you would have access to nuclear technology, materials, and facilities without any discrimination. And I believe that at present South Africa does not get equal treatment; I think the reason why the government has not yet decided to sign is because it is cautious about limiting South Africa's free access to nuclear technology.

[Van Koller] What is the present status of our uranium enrichment program? Are we up to par with world standards or are we lagging behind?

[De Villiers] I do not believe we are far behind. There are new technologies developed elsewhere which hold good prospects for less expensive enrichment, but you must remember that we developed this process about 15 to 20 years ago. The first use of this process was in 1978. To develop new technology from scratch and implement industrial applications takes years. So we developed this plant about 8 years ago based on technology at that time, which was equal to technology used throughout the world. If we were to build another plant in the future, we would investigate other processes.

[Van Koller] Would you like to comment on allegations that our enrichment technology could be used for military purposes?

[De Villiers] Look, any process such as enrichment can be used to produce enriched uranium which could be used militarily. It means that a higher percentage of uranium 235 would have to be used. With the inferior enrichment process which we use, which is about 3 and 1/4 percent enrichment, it is not possible to build a nuclear weapon. But the fact is, if people have the technology, they can apply it to that purpose if they so wish. But our government has stated repeatedly that we are interested in peaceful applications of nuclear energy; in 1984 it also said that South Africa would conduct its nuclear activities in accordance with the letter and spirit of the nuclear arms control agreement and that it would be prepared to negotiate with the IAEA on guarantees on the enrichment process.

[Van Koller] Would we be prepared to discuss nuclear technology with Third World countries?

[De Villiers] Certainly. We have said in our statement that South Africa is still prepared to cooperate with all countries and supply them with material and equipment if there are international guarantees.

/12624
CSO: 5100/4

MOSCOW TV CITES LONDON TIMES STORY ON ISRAELI NUCLEAR WEAPON

LD072328 Moscow Television Service in Russian 1615 GMT 7 Oct 86

[From "The World Today" program presented by Igor Kudrin]

[Excerpts] Israeli Prime Minister Peres hands over his office in a few days to the current foreign minister, Shamir. Everything seemed to be going smoothly in the already agreed changeover, when suddenly a scandal broke out. Everything began with a sensational publication by the British weekly, SUNDAY TIMES. The world community received confirmation of the fact that for 2 decades Israel has had its own nuclear weapon. Thus Tel Aviv's state secret -- its most valuable secret, as one paper wrote -- became common knowledge in a public and scandalous way.

Israel is hurrying to make some sort of statement, refutations are being written and vows are being made that the Israeli state never intended to use nuclear weapons against the neighbors. Hints are being made that the article in the British weekly is itself doubtful. However, the data in the SUNDAY TIMES are convincing and strictly documented, the pictures and testimony were examined first by experienced experts.

Naturally, Israel was helped to set up this criminal factory in violation of the Nuclear Non-Proliferation Treaty by the Western countries. It is no accident that when U.S. inspectors visited the Negev desert, they did not discover anything. They did not want to find anything. At the time the authoritative special U.S. Congress commission also failed to establish the guilty party in the mysterious explosion in the Indian Ocean in 1979, while everything pointed to Israel. [video shows copy to SUNDAY TIMES, pictures of several installations and control rooms]

/12624
CSO: 5100/3

COMMENTARY EXAMINES RSA NUCLEAR WEAPONS PROGRAM

LD131105 Moscow Radio Peace and Progress in English 1630 GMT 9 Sep 86

[Unattributed Commentary]

[Text] The London weekly WEST AFRICA warns the racist regime in Pretoria has been having a potential for dealing a nuclear strike for 9 years now. By all appearances, believes the weekly, South Africa held its first nuclear testing on 22 September 1979 when a (?flare) identical to a small nuclear detonation was registered over the South Atlantic. The African countries are now concerned over the implementation of the South African nuclear program, and not without reason either since the Pretoria rulers repeatedly claim (?about) the possibility of using nuclear weaponry. (?they have cynically described them) as contingency weapons in their struggle against other countries and national liberation movements in the continent.

South Africa's magazine OPTIMA reports the country can now produce two atomic bombs from enriched uranium put out by top secret plants in Valindaba, Traansvaal Province. However, in the final analysis it does not matter how many bombs and of what capacity can South African racists produce at present, but it needs to be pointed out particularly that the responsibility for the shadow (?of a) nuclear threat now looming over Africa should be shared also by apartheid's imperialist patrons, and first and foremost by the United States who encourages Pretoria's nuclear ambitions. [sentence indistinct] In their hatred for national liberation movements, they are prepared to use this weaponry of mass destruction. And indeed the first South African reactor, Safari-1, the uranium enrichment plant in Valindaba and the reactors at the (Koeberg) nuclear plant, all these are only among the largest facilities commissioned and now under operation through direct collaboration from Allis Chalmers, Fluor Corporation, and other U.S. companies. Besides the United States supplied South Africa's nuclear installations with enriched uranium. Dozens of nuclear physicists from the United States now work at those installations.

South Africa ranks third in the world in imports of U.S. equipment for nuclear industry. Prominent American scientist (Thompson) believes the Reagan Administration has no intention of disrupting its collaboration with the apartheid regime in nuclear studies, although it continues to refuse to join the Non-Proliferation Treaty, which is again evidenced by the limited sanctions on South Africa imposed by the American President. However, points out the scientist, there are loopholes left enabling the United States to continue to participate in South Africa's nuclear program. Incidentally, the United States signed a secret agreement with the apartheid regime committing itself to enriched uranium supplies to that country until the year 2007.

Clearly the connivance of the United States and other leading Western powers (?with) apartheid's plans of developing and modifying its nuclear weaponry is fraught with serious threat to peace, both in the region and around the planet. Along with the issue of nuclear arms proliferation, it now falls into the hands of the criminal regime of apartheid [as heard] who continues its policy of terror and violence toward that country's oppressed black majority and aggression on the independent neighboring countries. In this connection, believes the ETHIOPIAN HERALD there is a need for the African nations to rally their unity so as to be able, by concerted efforts, to counter the nuclear blackmail by the Pretoria rulers and their imperialist patrons.

/8309
CSO: 5100/2

AFP: PLANNED CHERNOBYL-TYPE REACTOR DROPPED

NC141118 Paris AFP in English 1101 GMT 14 Sep 86

[Text] Sept 14 (AFP)--The Soviet Union has dropped plans to build any more Chernobyl-style nuclear plants but will complete work on those under construction, Jacques Valade, leader of a French parliamentary delegation which has just visited the Ukraine, said here Sunday. He said Soviet officials had told him future nuclear plants would be of the pressurised water reactor type.

The Soviet decision follows the April 25 nuclear disaster at Chernobyl 80 miles (130 kilometres) north of Kiev, which pumped clouds of radioactive fallout over much of Europe.

On August 25 Soviet delegate Valeriy Legassov told the International Atomic Energy Agency in Vienna that Chernobyl-type RBMK reactors under construction would be completed, but gave no details about the future of the Soviet nuclear programme.

The French parliamentarians who toured the accident site by helicopter said work on encasing the burnt-out reactor was a "long way" from completion. Soviet experts at Vienna had announced the reactor would be entombed by the beginning of next month. Mr. Valade said local officials could give no date as to when people evacuated from the affected zone around Chernobyl would be allowed to return, and the most optimistic mentioned 30 years as the earliest.

Mr. Valade said the streets of Kiev were still washed down three times a day and urban wastes with higher than normal radioactivity levels were dumped in leakproof trenches. He said Soviet experts feared foodcrops might have absorbed radioactivity through the soil and they were constantly monitored.

/8309
CSO: 5100/2

USSR

BRIEFS

TASS: SECRET PLANT IN ISRAEL—London October 5 TASS--A secret underground plant in operation in the Negev Desert has been producing nuclear warheads for twenty years now, the newspaper SUNDAY TIMES reports today. According to the available information, this Israeli plant may have started now the production of thermonuclear armaments of the power vast enough to incinerate big cities, the SUNDAY TIMES points out. [Text] [Moscow TASS in English 2154 GMT 4 Oct 86] /8309

JAPAN WATER LEAKAGE REPORT--Tokyo September 2 TASS--The leakage of radioactive water from the supply system of one of the reactors has taken place at a nuclear power plant in the city of Tsuruga, Japan, 335 km west of Tokyo. A spokesman of the Department of Natural Resources and Energy reported today that in the course of trials at the second power unit with a capacity of 1.16 million kilowatts the air tightness of a water pump was broken. The personnel of the power plant had to stop the power unit immediately. The atomic power plant was to reach capacity by next March. This is the third incident at Japanese atomic power plants for the past month. [Text] [Moscow TASS in English 1621 GMT 2 Sep 86] /8309

U.S. PROTESTORS PENETRATE SITE--New York September 5 TASS--TASS correspondent Igor Makurin reports: A group of peace campaigners from Nevada and Colorado have held a protest demonstration against the incessant U.S. nuclear explosions. They penetrated the territory of the nuclear test site and reached the area of a supposed epicentre of the regular nuclear explosion which is soon to be conducted, according to the plans of the Reagan administration. There they were arrested by the police. They are facing the threat of a long imprisonment and a heavy fine. It was the eighth civil disobedience action in the current year. On the same day four participants in the previous demonstration in the Nevada test site were taken to Las Vegas where they will serve their term. Hal Brody, one of the participants in the demonstration, told TASS by telephone that the purpose of their latest protest demonstration was to call the attention of the U.S. public to the nuclear disarmament problem, to try and force the administration to join the Soviet moratorium on all the nuclear explosions and in this way to block the creation of new nuclear weapon systems. Brody said that he and his comrades regarded the decision of the Soviet Government to stop unilaterally all the nuclear explosions as the most important

Soviet peace initiative and were doing their utmost for making Washington support it. They decided to stage the protest action because they believed that their cause was right, believed in nuclear disarmament. In their opinion, the unwillingness of the congress to support the policy of the administration in the sphere of nuclear explosions, which follows from the recent voting in the House of Representatives and the resolution of the Senate, is an important result of the struggle of the American peace-minded public against the nuclear arms race, for arms control. [Text] [Moscow TASS in English 0634 GMT 5 Sep 86] /8309

CSO: 5100/2

RESEARCHER: CHERNOBYL ACCIDENT COULD HAPPEN EVEN IN FINLAND

Helsinki HELSINGIN SANOMAT in Finnish 5 Sep 86 p 2

[Article by Olli Tammilehto: "Chernobyl Accident Could Be Repeated in Other Reactors"]

[Text] Candidate in Philosophy Olli Tammilehto has written about energy and environmental questions since 1977.

According to Managing Director Anders Palmgren of Pevo or Perusvoima Company, the Chernobyl accident does give not any cause for any notable changes at the nuclear power plants in Lovisa and Olkiluoto since Chernobyl differs completely from the types of plants used in Finland. Palmgren emphasizes that Finland's nuclear power plants are safe even after Chernobyl. This is what the newspapers said in May. Palmgren's colleagues in all countries have made similar statements.

It is a fact that the Soviet Union is the only country that has so-called channel reactors. But does this dissimilarity make them more dangerous than other reactors -- or is it the other way around? Are common traits in nuclear power plants, perhaps, more decisive to the issue of safety than differing characteristics?

Before Chernobyl the engineers at IVO [Imatra Power] and TVO [Teollisuus Power] gave assurances that accidents at large nuclear power plants are in practice impossible. The representatives of other Western power companies have presented the same arguments. But Soviet experts were not to be outdone by those giving assurances.

For example, Soviet Energy Minister Pyotr Neporozhni stated in September 1984: "Nuclear power plants are very economical and they can be built in the immediate vicinity of a city since they do not emit smoke and are completely safe."

Faith in Safety

In addition to the Chernobyl-type channel reactors, pressurized water reactors, which are also the same as those in Lovisa, are to be found in general use in the USSR. Of these two types the Soviets do not consider channel reactors to be any less safe. For example, in Soviet textbooks on the subject channel reactors are said to be especially suitable for the vicinity of large cities.

Also articles appearing in Western nuclear energy journals before the accident give a positive picture of the safety of channel reactors. What was the basis of this trust?

For example, an important structural difference with respect to Finnish power plants is that instead of a single cooling sphere for all the fuel elements, the channel reactor has its own cooling sphere or channel for each element.

Because of the structure of the channel, it was thought that disturbances would be localized and limited. Since it is possible to remove an individual fuel rod during operation in these reactors, the control of leaks is easier than in more conventional nuclear power plants.

The graphite fire in the Chernobyl Nuclear Power Plant effectively spread nuclear pollutants around Europe. The use of graphite as such as a neutron inhibitor has, however, been considered to increase safety since a large amount of graphite decelerates the development of an accident with with its thermal capacity. Thus, generally, there is no containment building for graphite-moderated reactors in Western countries.

However, after the accident the tune of the nuclear power industry in Western countries changed: Chernobyl was exceptionally dangerous.

The most frequent argument was that there was no containment building at the nuclear power plant in Chernobyl. However, it became evident that a containment building at Chernobyl would not have been much help. For example, Jukka Laaksonen, assistant section chief of the reactor safety section in the Radiation Safety Center, admitted on television June 5 that the containment buildings at Lovisa's plants would not have withstood the explosion that occurred in connection with the accident.

The explosive substance at Chernobyl was the mixture of hydrogen and water. Hydrogen can be generated under the conditions of an accident in Finnish power plants also, for example, as overheated zirconium from the fuel can reacts together with water. In the literature of Western countries dealing with nuclear safety a hydrogen explosion has been considered to be a significant threat, particularly in boiling water reactors, which are being used in Olkiluoto.

A Strong Containment Building

Later it became evident that the information of Western experts on the Chernobyl Nuclear Power Plant was, indeed, lacking or there was an attempt to mislead the public: the Chernobyl Power Plant had a containment building.

This fact came to the attention of the world's press when James Asselstine, a member of the U.S. Nuclear Safety Commission, stated in congressional hearings that there were, in fact, two structures "similar to a containment building" at the power plant in Chernobyl. They were designed to withstand an excess pressure of 1.86 bar.

The containment building at the power plant in Lovisa is designed to withstand only an excess pressure of 0.868 bar. The containment building is just as weak or even weaker in many American nuclear power plants.

The dangerousness of the Chernobyl Power Plant is also argued by the fact that its procedures functioned differently when the cooling water is lost: in a channel reactor output increases while, on the other hand, output generally decreases in reactors in Western countries. This characteristic is, indeed, an obvious risk factor. Soviet experts have, however, been aware of this risk and they have succeeded in reducing the rate of increase in output in the newer reactors according to certain sources.

Even though the Chernobyl Nuclear Power Plant had risk factors which are not present in the most prevalent types in use in the West, the same also holds true in reverse: accidents which would not have been possible at Chernobyl can happen in so-called light water reactors.

Is Pressure Vessel Strong Enough?

There are two main types of light water reactors: pressurized-water reactors and boiling water reactors. Lovisa has the former and Olkiluoto has the latter. In pressurized-water reactors water is heated in a pressure of more than 100 atmospheres so that it cannot boil.

Water boils in the pressure vessel of a boiling water reactor, but it also generates a massive amount of pressure: approximately 70 atmospheres at Olkiluoto. A crack in the pressure vessel would be one of the worst imaginable accidents. (There is no pressure vessel in power plants of the Chernobyl type.) If this were to happen, no backup cooling systems or containment buildings will help.

No pressure vessel in any nuclear power plant has yet cracked. However, there are many pressure vessels in other types of industry also. They are, in most cases, made of better steel than the pressure vessel at Lovisa, for example, since this has been affordable because of their small size. Several pressure vessels used in industry have exploded.

Studies conducted in the United States and Europe since the 1950s indicate that a major accident can occur in nuclear power plants in countries of the West. This is, of course, very annoying for those who want to continue the use of nuclear power.

Recently power company representatives and experts close to them have argued that radioactive emissions in accidents are much less than previous estimates according to the most recent research results. Radioactive iodine would bind itself to the cesium and would, for the most part, remain inside the power plant. No residents in the vicinity would be in any "immediate danger" or no one would come down with any acute radiation illness.

Two important reports used to support arguments to downplay an accident appeared in November 1984. One was the so-called Idcor-report, which was compiled by the nuclear power industry itself, and its purpose was to show that the regulations of officials, which were compiled in the event of damage to the reactor core, can be made less stringent.

The second report, on the other hand, was compiled by the American Nuclear Society or an association of U.S. nuclear power engineers, which corresponds to the Atomic Engineering Society in Finland.

"Forgotten" Data

These reports have been diligently quoted in Finland. On the other hand, it did not occur to IVO's engineers or to so-called independent experts such as Professor of Radio Chemistry Jorma K. Miettinen to tell about a study that came out in April 1985. It was conducted by the American Physical Society and it was funded by the Nuclear Regulatory Commission. According to the study, accident related calculations will contain so many factors of uncertainty that there is no cause to lower assumptions concerning the amount of radioactive emissions.

Official experts also have not told about the test results obtained in leading nuclear engineering research institutes in the U.S. These test results were made public at the end of last year. Sandia National Laboratories and three other laboratories have all come to the conclusion in their tests that iodine will not appear in combination with cesium under the conditions of a nuclear accident. Thus large amounts of iodine can also be emitted into the atmosphere in nuclear power accidents occurring in the West, as has been assumed in the worst case accident scenarios.

Thus nuclear power plants of the Chernobyl type cannot be considered more dangerous than those in use in Finland. Even though certain properties make the control of Soviet channel reactors more difficult than the norm, other differences between them and the Finnish reactors, on the other hand, increase the safety of Chernobyl-type reactors. The properties they have in common are, however, more important from the point of view of the dangerousness of nuclear power plants.

Risks of A Shutdown

Even though a nuclear power plant is shut down or "driven down" in an emergency situation -- for example, in the event of a leak -- the reactor continues to generate heat with a great capacity: radioactive disintegration, which initially generates heat at 6--10 percent of the reactor's full capacity, continues even after the chain reaction splitting uranium nuclei ceases.

Thus several hundreds of megawatts of energy are generated from the reactor or just as much as what is produced by the largest municipal heating plants. Thus large amounts of water or some other cooling agent must be pumped into a "shut-down" reactor also in order to prevent overheating. The pumps, on the other hand, are operated by electricity or steam. If electricity cannot be obtained from the network or from the power plant's own reserve power generators, a catastrophe is inevitable.

The supervision and control of a nuclear power plant are based on complex electronic equipment. In recent years the Soviet Union has purchased monitoring and control equipment for its nuclear power plants from the West. Probably, some of the instruments at the Chernobyl Nuclear Power Plant were from the West.

One of the weakest links in the safety of a nuclear power plant is materials engineering. Steel and other materials used in the core of a nuclear power plant must in addition to high temperatures and pressures also withstand continuous neutron bombardment, which makes them brittle. Apparently, the capacity to manufacture sufficiently strong steel does not yet exist and, therefore, it is the materials engineering aspect which draws the most criticism from engineers as far as nuclear power is concerned.

In the final count, the safety of all nuclear power plants is based on the fact that the planners, builders, inspectors, and finally the operations personnel act in the expected manner and do not make any major mistakes. However, human errors do occur. Both the Harrisburg and Chernobyl accidents took place in the early morning hours when people commit the most errors according to studies.

Military Needs

If everything said above is true, how is it possible that these risk-prone plants have, in general, been built in our midst? One explanation can be found from the origin of nuclear power technology. The need to be concerned with human safety did not even in the beginning determine the development of nuclear reactors. Military aims dictated the directions of development and, as is well known, the first concern of military men is not the preservation of human life.

The type of reactor used at Lovisa was originally developed in the United States for nuclear submarines. The most important factor was its light weight -- and not safety.

The Chernobyl-type channel reactor as well as the Western grafite-moderated reactors were originally developed for the production of plutonium used in bombs. The most important factor was to reduce the production costs of raw material for nuclear weapons -- and not to be concerned with safety.

10576
CSO: 5100/2574

PROBLEM AT LOVISA REACTOR DESCRIBED

Helsinki HELSINGIN SANOMAT in Finnish 5 Sep 86 p 13

[Article: "Water Leak at Lovisa Number 2 Plant Was Threatening"]

[Text] The Radiation Safety Center describes the situation that occurred at the Lovisa number 2 plant on Wednesday as threatening. A valve defect, which halted the start-up of the power plant, was in the primary sector of the power plant, in which water is in direct contact with the nuclear fuel. The situation was rescued by the fact that the defect was quickly corrected.

Imatra Power will also have to stop the unit one power plant in Hastholmen. The reason for the interruption of electric production is an extraordinary sound coming from the main circulation pump.

The pump cannot be inspected unless the plant is shut down. The repair or replacement of the pump will require the shut-down of the whole plant, and the duration cannot for the time being be estimated.

Ten Cubic Meters of Water Lost

In the valve leak on Wednesday in the number two unit approximately 10 cubic meters of the primary sector's 250 cubic meters of water leaked out. According to the information disclosed on Thursday, the water was collected into the plant's internal collection system and there was no immediate danger from the leak to personnel or to people outside of the plant.

The amount of radiation in the water leaked was 200,000 Bacquerel rays per liter or 10 times more than the highest radiation dosages confirmed in food products.

Cause of Defect Not Yet Found

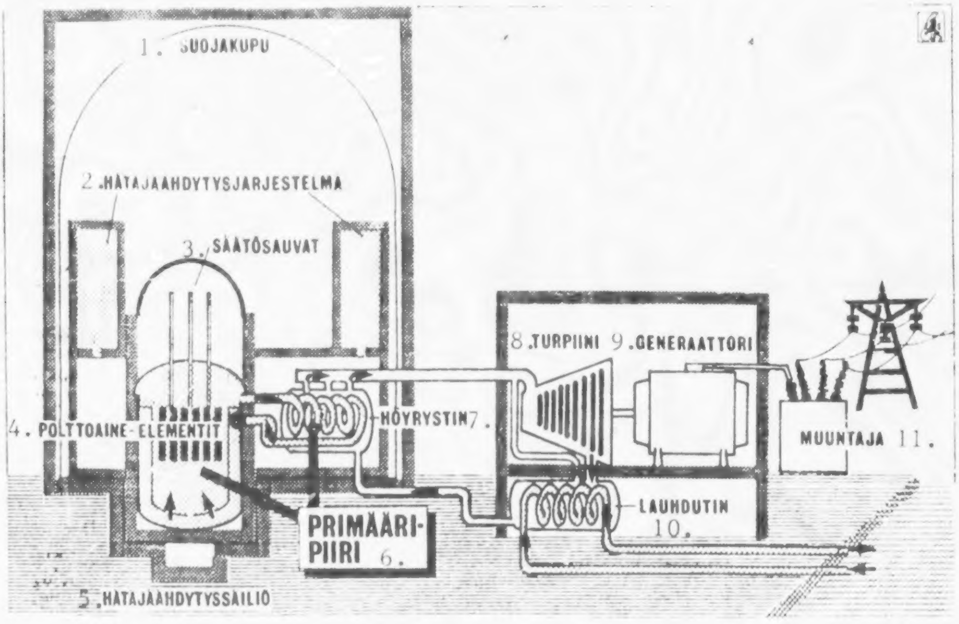
There were several inspectors present from the Radiation Safety Center when the accident occurred at Lovisa. Inspectors are usually at the plant during repair and maintenance operations as well as when nuclear power plants are put into operation. Now the officials received notification of the incident from their own sources sooner than it is given by Imatra Power.

According to Jussi Helske, operations chief of Imatra Power's Lovisa Plants, the valve defect has not yet been completely clarified. Imatra Power will compile a report on the defect for the the Radiation Safety Center, and the number two plant cannot be put back into operation until after the report.

In 1980 the number one plant at Lovisa was shut down for 7 months because of defects and inspections.

More electricity than normal will have to be produced from Inkoo's coal-fired power plants. Teollisuus Power's two nuclear power plants at Olkiluoto are operating normally.

The maintenance and repair work on nuclear power plants have usually been timed for the summer since the consumption of electricity is at its lowest at that time. Now this work has been postponed until the fall because of the spring strikes in the electric industry.


1. SUOJAKUPU
2. HÄTÄJÄÄHDYTYSJÄRJESTELMÄ
3. SÄÄTÖSAUVAT
4. POLTTOAINE-ELEMENTIT
HÖYRYSTIN 7.
8. TURPIINI
9. GENERAATTORI
MUUNTAJA 11.
LAUHDUTIN 10.
PRIMÄÄRI-PIIRI 6.
5. HÄTÄJÄÄHDYTYSSÄILIÖ

The valve defect was in the nuclear power plant's primary sector, in which water was in direct contact with the nuclear fuel.

Key:

1. Protective dome
2. Emergency cooling system
3. Control rods
4. Fuel elements
5. Emergency cooling reservoir
6. Primary sector
7. Evaporator
8. Turbine
9. Generator
10. Condenser
11. Transformer

10576
CSO: 5100/2574

FRANCE

SAFETY FROM CHERNOBYL TYPE ACCIDENTS QUESTIONED

Orsay (Paris) LA GAZETTE NUCLEAIRE in French Jul/Aug 86 pp 20-24

[Unattributed Article: "Is an Accident Similar to Chernobyl Possible in France?"]

[Excerpts] For many years -- one might say forever -- nuclear power officials (the "nucleocrats") have proclaimed that our nuclear technology was so good, that our EDF [French Electric Company] personnel were so well trained, etcetera...., that an accident was absolutely impossible, or at least highly unlikely. And in any case, assuming that..., our system of successive barriers should prevent any discharge outside the reactor structure.

Now, several comments can be made:

- The Americans at TMI [Ten Mile Island], with BWR reactors (thus different from ours, true, but that does not alter anything for our purpose), also had containment fears but this did not keep them, in a situation much less catastrophic than at Chernobyl, from allowing the escape of emissions, specifically into the atmosphere.

- The Soviets, on the other hand, did not have a containment shell: not because they are less intelligent, or more stingy, than others, but because "theoretically" their reactor design should not have posed the kind of problem which arose. Besides, have you seen a containment shell over our own power stations of the Uranium-Graphite-Gas system, the design of which is rather similar to that of the USSR system?... Now, against all expectations, that which should "theoretically" not have happened did happen and, 3 weeks later (as the Americans did at TMI), the Soviet experts are still wondering how this could have happened! The fact remains that the "escape" into the atmosphere was what we know!...

- Are we really certain that in case of an "unmeasurable accident," as they say in France to refer to a possible major accident, there could not be an unexpected mechanical explosion of unspecified origin within the reactor structure, which would then be likely to damage the containment shell, hence the last "barrier"? As far as that famous containment shell is concerned, one would like to know for how long it would be able to contain the products freed by a major accident, assuming no initial deterioration caused by an explosion. All those hypotheses on containment are a heavy burden, as we will see, on the validity and effectiveness of the emergency plans because this problem of controlling the containment directly affects the time available to act at the level of the population.

- For those who might be completely convinced that we are safe from an accident in France, we invite you to read carefully the following story on the incident which took place at stage No5 of the BUGEY on 14 April 1984, about which the official report notes that "it was undoubtedly the one incident which came closest to being a serious accident since the start of the first stage of the French REP park...

However, some evolution does seem to have taken place since Chernobyl in the state of mind of our nucleocrats: as this accident followed the one at TMI in the USA a few years ago, it would seem more and more difficult to argue that we are always more intelligent than the others -- at a maximum, it could still be said that perhaps we are the luckiest! Consequently, it is with some "relief" that we are beginning to hear a more realistic and more modest language as, at present, they no longer deny that an accident could happen in our country, even if at the same time they are still telling us that the consequences would be absolutely minimal... That remains to be seen! In any case, we said "relief" in view of this evolution because -- finally! -- they will perhaps stop treating people like imbeciles by hiding information from them, and perhaps take the imperative serious steps to improve preventive measures in all areas, from technical security studies to the establishment of "emergency plans" worthy of that name.

What Are the Emergency Plans Worth in Terms of Evaluating the Transfer of Radioactivity?

A very worrisome problem is that of the atmospheric dispersion of radioactivity and thus of its radiological consequences. In November 1985, at the IAEA (International Atomic Energy Agency) colloquium on "Planning and the State of Preparedness for Emergency Situations in Nuclear Installations," the French officials (Mr Scherrer from SCSIN [Central Service for Nuclear Installation Safety] and Messrs Evrard and Ney from the AEC's IPSN) stated the following (excerpt from the text of their presentation "Technical Organization of the Security Authorities in Case of an Accident in a Nuclear Installation"):

[...] "An effort is currently under way at IPSN to provide the crisis teams with specific and adapted means allowing them to fulfill their mission, both in terms of evaluating the transfer of radioactivity and of preventing possible releases at the time of an accident in a nuclear installation."

"Atmospheric dispersion of radioactivity and radiological consequences."

"For numerous years now, this problem has been the object of the development of rather complete resources. Operational charts of atmospheric transfers, based on a gaussian distribution model, have been drawn up and have been the object of a consensus among the various public bodies concerned. On the other hand, they are curently working on computerized resources using a gaussian bursts model and allowing consideration of variations in the emission flow and the conditions of dispersion (speed and direction of the wind, atmospheric stability) and subsequently the orography of the site." [...]

The fact can already be appropriately evaluated that after more than 10 years of nuclear programming, and while about 40 stages are in operation, "an effort is currently under way at IPSN in order to provide..."! But we are going to examine the real situation in the matter and thus see the current state of the issue.

Short Distance Atmospheric Diffusion Tables

Nuclear power stations are equipped with graphics and special tables (called "abacuses") intended to estimate the location of fall-out from the cloud emitted in case of an accidental release. The documents have been drawn up on the basis of experiments on specific sites, primarily flat, and have been standardized for all power station sites. They operate on the basis of emission data and local meteorological conditions measured at the 80 meter level.

Several comments are necessary here:

- The range of validity of those tables covers only a distance of about 10 kilometers around the source, which is very small: with a wind of 5 meters per second for example (very common), the gaseous effluents would cover that distance in less than 45 minutes! It is hard to see how any decision could be made... and implemented (!) in that short a period of time...

- Given their "standard" nature, those tables are more or less valid for those sites whose configuration is in the neighborhood of those where the experiments were conducted, that is to say for virtually flat sites. But, as everyone knows by studying the list of sites of French power stations, very few of them are located in a flat region. And it so happens that on a terrain with somewhat complicated topography, the conditions of air diffusion can present a few surprising aspects! The Americans for example have carried out precise experiments on some of their sites and have established that in the presence of relief, and with weak winds (thus not very organized in terms of direction), fall-out could be found a bit everywhere, and for longer periods of time than had been anticipated. It seems that in France, experiments of this kind have been started only recently, on certain sites.

- According to some information it would seem that there are unfortunate stories of "private reserves" between the AEC-EDF, who have developed the "operational abacuses" available at the power stations, on the one hand, and SCPRI [Central Service for Protection Against Ionizing Radiation] which has its own and would not want to hear about any others, on the other hand...

Propagation of Effluents on Regional Scale

The above mentioned comments show the fragility and inadequacy of the operational resources provided to estimate the trajectory of a possible radioactive release in the immediate vicinity of the power stations. But beyond that distance of about 10 kilometers, it is even worse when one tries to estimate what is going to happen between approximately 10 and 200 kilometers from the power station ("regional" scale). And yet that zone is vital because it is the one that would be involved in case of the evacuation of people, and, if one accepts the idea that the releases could be contained for a certain period of time in the containment shell, then it is indispensable to be able to decide on the "best" moments (or rather the least bad...) to effect delayed releases. But, what do we see?

- It is only rather recently that the EDF Research Services have started developing calculation models at the regional scale which take into account the relief. Very obviously, those studies are still rather far from leading to concrete operational procedures of the same style as the procedure existing for "short distances."

- Those models require, for validation and for delayed or direct computer use, very diversified meteorological data from field sources of relatively significant density. But the resources thus needed are voluntarily limited, not only for reasons of costs, but also for "diplomatic-psychological" reasons: how can you consider, for example, the installation of a few small stations for additional measures in our regions -- if not, and this is worse, on the other side of the Swiss border for Creys-Malville -- if you state very loudly that our containment shells are fully up to the mark and hence that there is no risk at all...

- The only meteorological measurements carried out on site (wind at 80 meters, characteristics of the lower strata of the atmosphere by depth sounder called SODAR, atmospheric pressure of a rather doubtful usefulness as a matter of fact) were made at the request of the security bodies and of SCPRI (by the famous Professor Pellerin), which require EDF to automatically and directly send all those data to the regional meteorological centers: but the latter merely store them (they do nevertheless increase the potential of the meteorological network), because up to now they have neither the mission nor the means of exploiting them usefully within the framework of operational regional models in real time. And EDF is also very happy to get rid of the baby...

Long Distance Transfer of Effluents

The Chernobyl accident has highlighted the importance of meteorology on a regional scale -- we have just talked about that -- but also on a continental scale! Everyone could see it: as the radioactive cloud naturally ignored the borders, the European countries were caught completely off guard and were able only... to take note of the damage on their own territories. In case of a serious accident, followed by release, at one of our 40 or so areas, would we be better equipped to inform -- and quickly -- our neighbors of an undesirable cloud possibly passing over their territory? Well, no, our equipment for this cross-border scale is even worse than on the regional scale. One might even wonder whether it is considered a real problem at EDF: it is true that the latter has recently made a deal with the national meteorological office to provide a whole set of regular data covering France -- but only France. But it is also necessary to have data at hand on a European scale -- which are, in fact, available from specialized meteorological centers.

Conclusion

Ultimately, this question of a transfer into the atmosphere of a possibly significant radioactive release requires several comments:

- No work is currently being done on developing a homogeneous and complete procedure which would make it possible to handle the problem of estimating what would become of a cloud emitted by a power station.

- Generally speaking, meteorology has always been somewhat neglected in the emergency plans (the example of Chernobyl shows us the vital importance of this factor): at most, it has been provided that a meteorology expert will be added to the release team within the framework of the ORSEC [Disaster Relief Organization]-RAD plan.

- For various reasons the division of labor is skilfully maintained, both within EDF among the various directorates, operations, research, etcetera... and between the EDF and other bodies: AEC, national meteorological office, SCPRI, etcetera... This situation seems very prejudicial to us, both in terms of research to improve safety or security conditions in all areas, and in terms of the effectiveness of the emergency plans.

- The question of centralizing all technical data of all kinds (including meteorology, operational calculation models, etcetera) in a decision making center is still open; this would be in a location other than the power station itself (it would be hard to imagine a crisis command post seriously operating in a power station which has experienced a serious accident...).

Have There Been Other Accidents?

A large number of problems have existed with experimental reactors. One of them is of the same type: fire in the graphite. It took place at Windscale in 1957 in England.

At that time the effects were minimized; we had to wait 20 years before the reports appeared: they really provided an inventory of the products which left the core, and the long term consequences are being studied.

As far as accidents in large units are concerned, there was TMI in 1979 and Chernobyl in 1986. As for the rest, well the future will tell us.

On the other hand, Chernobyl has recalled the memories of the fall-out of the atmospheric explosions in the sixties. In France we were able to note that on 1 May the cloud sent us 1000 times more cesium than the fall-out of those explosions. True, spread over the whole year it will not amount to much, but it is nevertheless too much.

Are There Reactors in France Without Containment Shell?

Obviously there are the gas graphites: we have four of them left: one at Chinon, in the process of being repaired (Chinon A3), two at St. Laurent des Eaux (St. Laurent A1 and A2), one at Bugey (Bugey 1).

The first one is not of an integrated type: which means that the vessel does not contain the heat exchangers. On the other hand, the three others have a cooling circuit so that the pressurized carbon dioxide does not leave the vessel, which contains the core and the exchangers.

It is true that those reactors are enclosed in a vessel but there is no supplementary containment shell around the reactor. Now, the upper plate is full of holes to allow the reactor to be loaded and unloaded without stopping it. It is the system which makes it possible to obtain military quality plutonium, as is also possible with the Russian reactor.

Appendix

Actions Taken in France Following TMI

Following the publication of the Bugey incident, which typically reflects not taking into account of the lessons of TMI, EDF came up with a magnificent dossier on the subject.

There are a few bright spots.

"... Since the beginning of April 1979, a working group was created to identify actions..."

"... It should be noted that the security analysis which was carried out has not brought to the fore any anomaly that might interrupt or delay the putting into service of the 900 megawatt units under construction at the time, or to stop the units in operation (Fessenheim, Bugey)."

"... At present, the detailed balance sheet of the actions is as follows:
- for the 900 megawatt units, the studies have been completed and 90 percent of the modifications have been made. The remainder will be almost completely finished by the end of 1986. Their implementation will have cost on the order of 1 billion francs;
- for the 1,300 megawatt units, all the actions have been completed (because the first units were just in the first stages of construction in 1979 and the studies were able to take the effects of TMI into account immediately);
- for later units, the action plan as a whole is taken into account from the time of conception."

"In late 1985, the security authorities approved all the results of the French action plan and it may be considered completely finished."

Commentary

A nice example of EDF publicity for the benefit of the media and the public.

However, reality is quite a bit different.

At the time of the June 1985 session, the CSSN examined those famous lessons of experience. And what did they find?

1. Problem in Energy Power Supply System

Various incidents took place:
. 1-11-1983: Graveline 4, jamming of a piston.
. 2-10-1983: Bugey 3, rupture of two tappet push rods.
. 4-21-1983: Dampierre 4, jamming of a piston.
. 8-15-1983: Cruas 1, rupture of a connecting rod.
. 11-28-1983: Blayais 3, rupture of a fuel injection pipeline.

And if you consider the Bugey 5 incident of April 1984, the importance of the mergency supply system is obvious. At the request of the security authorities, EDF must add additional equipment for gas turbines. The progress of the implementation, described by SCSIN in June 1985 was:

"... There is a gas turbine on every 90 megawatt site. For the 1,300 megawatt sites, the French Electric Company si considering the strategy to follow: one turbine per site or per region which could be put into place quickly."

... and if that is not enough, they will make the center's personnel pedal generators!!!

2. Implementation of Security Measures

"... to send me a certain number of files about nine specific points: eight of those files did not get to me."

This refers to a 1984 request and the letter is dated 1985. As they are requesting them to be sent within 3 months, one would like to know in 1986 whether those famous files finally did arrive.

3. Delays in Completion

The SCSIN wrote to EDF:

"With regard to delays in completion, I have noted that your company has difficulties in quickly implementing certain modifications of the units"...

Not bad, who chooses? EDF or the security authorities?

Even better, the SCSIN also wrote:

"Finally, I have noted that your company has difficulties in taking my requests into account; those difficulties are translated into delays in taking them into account, if not a lack of taking them into account."

We are forced to comment that EDF may always continue to state that the post TMI period has been useful to them. To produce papers, surely, to make improvements, that remains to be seen.

A series of incidents:
* were due to non-hierarchical alarms: thus the employees do not, as a matter of fact, know what has broken down;
* were due to confusions of units: the grouping of the facilities is studied so well that the employees got the wrong unit when they wanted to carry out a maneuver;
* were due to the fact that no attention was paid to previous incidents.

Last quote:

"Ill-timed opening of the RRA's rate control valves. I would like you to specify, within less than 6 months, the steps to be taken so that the location of those valves is known at all times, at least locally."

Well bravo, for having reached the point, in June 1985, of asking to know the exact location of the valves.

In 1979, that was precisely one of the causes of the accident at TMI: the monitor in the machine room signaled that the order had been given but did not give the location.

Six years later, this letter allows us to understand that we are still at the same point!

8463
CSO: 5100/2578 END

JPRS-TND-86-025

17 NOVEMBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT
AND
PROLIFERATION

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JPRS-TND-86-025
17 NOVEMBER 1986

WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

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KURANARI URGED TO ATTEND DISARMAMENT CONFERENCE

OW130613 Tokyo KYODO in English 0350 GMT 13 Oct 86

[Text] Tokyo, 13 Oct (KYODO)--Miljan Komatina, secretary general of the 40-member Geneva-based Conference on disarmament, told Foreign Minister Tadashi Kuranari on Monday that Japan should make a greater contribution to world disarmament efforts, a Foreign Ministry official said. Komatina, here since last Saturday at the invitation of the Foreign Ministry, asked Kuranari to attend the Geneva conference and express Japan's position on disarmament, referring to the many visits and speeches to the conference by foreign ministers and prime ministers of other countries, the official said.

Kuranari said Japan has proposed monitoring of nuclear tests using Japanese expertise on earthquake detection. He expressed hopes of attending the disarmament conference after consulting with Prime Minister Yasuhiro Nakasone, the official said.

According to Komatina, the conference is making progress on inspection of chemical weapons. He said the Soviet Union is trying to narrow the inspection range, while the United States wants a wide inspection, adding that a compromise might be the best solution, according to the official. Komatina will meet Diet members and visit Nagasaki and Hiroshima before he leaves Tokyo on 22 October.

/9274
CSO: 5160/010

INTER-AMERICAN AFFAIRS

ARGENTINE MINISTER NOTES 11 PROJECTS WITH BRAZIL

Rio de Janeiro O GLOBO in Portuguese 6 Sep 86 p 16

[Text] Buenos Aires--Five weeks after Presidents Jose Sarney and Raul Alfonsin signed the 72 protocols that formalize the economic integration between Brazil and Argentina, the two countries reached a perfect understanding, in practice, on one of the most important items in the agreement; the nuclear area.

The director general of Nuclear and Disarmament Affairs of the Foreign Ministry, Minister Adolfo Saracho, told O GLOBO yesterday afternoon that the positions of the two governments proved to dovetail and coincide so closely that there are already 11 concrete projects of collaboration between Brazil and Argentina in that area.

Saracho said: "The study groups will present a detailed report on those projects next week, specifying their feasibility and the amount of funds necessary to begin to develop them."

According to him, all of the planning part and its respective estimates will be ready in November, when the governments will decide if all of the programs will be begun simultaneously or if priority projects will be defined. Everything is going to depend on the costs, which initially would be divided equally between the two countries.

Alleging "reasons of state," Minister Saracho said that he could not yet reveal the nature of all 11 projects.

"There are some that we cannot reveal now, for one reason or another, but by the end of the year everyone will know what it is all about. What I can say is that there is no secret project, as is rumored. What I mean to make clear by that is that there is no military project being developed jointly."

According to the director general of Nuclear Affairs and Disarmament of the Argentine Foreign Ministry, the two countries will work together, especially to achieve mastery of the technology for the manufacture and use of low-enrichment fuels, which would be used in research reactors.

Another program pertains to providing Brazil and Argentina with the capability to produce radiation detectors.

With regard to nuclear safety, the projects provide for the development of calculation codes for the release of radioactive materials from the nucleus to the primary circuit and from there to the reactor containment in accident conditions.

"We are also working on the development of a philosophy and the implementation of common plans," concluded Saracho.

8711/7051
CSO: 5100/2005

ARGENTINA

PRESIDENT INAUGURATES TANDAR ACCELERATOR

PY241854 Buenos Aires TELAM in Spanish 2046 GMT 23 Oct 86

[Text] Buenos Aires, 23 Oct (TELAM) -- The Tandar [Argentine Tandem] Laboratory, which will be inaugurated today by President Raul Alfonsin, is part of the National Commission for Atomic Energy (CNEA) physics department. The laboratory features a heavy ions accelerator of 20 billion volts, one of the four most advanced in the world after those of Oak Ridge (U.S.A.), Ajeri (Japan) and Daresbury (United Kingdom).

The main objective of the Tandar laboratory, which is located at the Constituyentes Atomic Center on General Paz Avenue in San Martin District, is to conduct basic research in nuclear physics, solid-state physics, and atomic physics.

The Tandar is a tool used to study the atomic nucleus, by accelerating ions. An intense electric field accelerates the ions and permits studies on the properties of nuclei, their reaction mechanisms, and their inter action in condensed matter.

This is a laboratory of great versatlity in which virtually all the stable elements known to man can be accelerated. Highly radioactive elements can be obtained through nuclear reactions between two heavy nuclei. In addition, nuclear fission and fusion in an extensive range of different systems can be investigated.

The Tandar laboratory will also host groups carrying out basic and applied research in other fields. They will also study the detection of damage to biological and metallurgic objects through the simulated radiation of ions, the production of new radioisotopes and of others that presently must be imported; the analysis of samples without damagaing them, and the dating of archeological samples, among other activities.

The Tandar construction project was approved in August 1976. The accelerator was ordered from Electrostatics International Inc., one of the two U.S. companies that sell this equipment.

The detail engineering and local construction work was entrusted to Technit, the vessel construction and installation to Chicago Bridge Argentina, the civil works to Vialco, and the electromechanic works to the Vialco-Somerfin consortium.

The acelerator was commissioned in September 1985. During previous tests it generated a maximum of 24.7 million volts, the largest amount of energy ever generated artificially in the Southern Hemisphere.

The main tower is 13.70 meters high and has a 2 meters of protective shielding supporting the base of the pressure vessel. The tower contains the accelerator column and the terminal which is surrounded by a sulphur hexafluoride (hexafloruro de azufre) gas, used to create an atmospheric system as (electrically) inert as possible.

The control rooms, or main measuring rooms, are located in the lower section, as are the test rooms, a revolving 7 degree reflector magnet, and the gas storage tanks.

More than 60 physicists work in the CNEA physics department with 45 of them holding masters degrees either in Argentine or foreign universities. A group of 40 engineers, together with 40 experts, are in charge of operation and maintenance, supplementary equipment and support laboratories.

/9274
CSO: 5100/2029

ARGENTINA

CONGRESSIONAL COMMITTEE WITH BROAD NUCLEAR POWERS PROPOSED

Buenos Aires LA PRENSA in Spanish 23 Sep 86 p 6

[Text] National Deputy Maria Julia Alsogaray, of the Democratic Center Union, introduced a bill intended to "set up a bicameral commission with ample powers to investigate, verify, request documentation, visit public and private installations where radioactive elements and materials are stored, manufactured, transformed or handled in any manner.

"For that purpose, it will enjoy the broadest powers and all national, provincial and municipal authorities are bound to make available the fullest information about any aspect concerning nuclear security that the commission requires.

"It will be entitled to seek the advice of national or foreign scientific technicians, and ask for information that it deems appropriate from international organizations of nuclear security.

"It should give special emphasis to the hypotheses of nuclear accidents, and, in cooperation with the civil defense organizations, it should recommend measures that it deems appropriate to prevent and correct any defect that will pose an eventual threat, studying the location of nuclear installations and all other aspects that will help to enhance public security.

"It should consider and propound the necessary measures to dispose of nuclear waste with the greatest safety.

"It should study projects for the location of new nuclear plants and other installations for the purpose of avoiding as much as possible their proximity to inhabited areas.

"It may propound the institution of a national organization of nuclear security.

"It should specifically analyze the nuclear situation in neighboring countries, and the possible consequences of a nuclear accident in another country."

8414/12859
CSO: 5100/2009

ARGENTINA

UNIVERSITY OFFICIALS ANNOUNCE NUCLEAR ENGINEERING ACCORD

Cordoba LA VOZ DEL INTERIOR in Spanish 20 Sep 86 p 7

[Text] In a ceremony that was held yesterday at the Regional School of Cordoba of the National Technological University (UTN), an agreement was signed between that institution of higher education and the National Commission for Atomic Energy (CNEA).

The UTN, represented by its rector, Juan Carlos Recalcatti, and the CNEA, represented by the manager of the Embalse Nuclear Power Plant, Ricardo Diaz, acting on behalf of the chairman of the state enterprise, agreed on a program of mutual cooperation and technical assistance for the training of human resources and the dissemination of technology.

For the practical purposes of this agreement, both institutions concurred on the establishment of a coordinating committee that will serve to centralize, guide and promote the programs, initiatives and projects concerning the stated goals.

The rector of the UTN explained the extent of these accords set forth in the addenda dealing with three concrete projects: one is the possibility of exchanging professionals, courses and training between the heavy water power plant in Arroyito, Neuquen, and our academic unit of Cutral-Co Plaza Hincul-Confluencia; the second concerns the Delta Regional School in Campana, and the postgraduate courses in nuclear engineering that the Atucha atomic power plant would like it to offer; and as to the third, it could be almost the same thing here in Cordoba.

With regard to this project, Recalcatti stated that "taking into account the tasks that are being performed at the Embalse power plant and the development tasks that the regional school can provide, specialized courses in nuclear engineering could be set up in Cordoba or in Rio Tercero."

With respect to the financing of these projects, the UTN rector explained that "for each accord, everything dealing with equipment will be discussed separately and furnished by both entities, that is to say, by the cooperative system."

Asked whether this agreement will be used for the production of isotopes, Regino Maders, dean of the UTN's Regional School of Cordoba, considered that it "could be so in a second stage" inasmuch as, in principle, "this first portion would consist of an exchange of scientific action directed at courses and training, yet that is foreseen.

"Though the intention exists," Maders added, "we cannot assure yet what would be included in the area of isotopes because there are some agreements with the provincial government that we would have to coordinate, therefore that would be a second stage."

On a different subject, the UTN rector was asked about the present situation at the university with respect to the quadripartite government, and he said that once "the incorporation of the nonteaching personnel to the university administration as the fourth estate was decided," the elections are being set up "after we agreed with the union that those elections would be held on 16 November."

8414/12859
CSO: 5100/2009

RADIOACTIVE MATERIAL STOLEN FROM PHYSICIAN

PY161344 Buenos Aires TELAM in Spanish 0031 GMT 16 Oct 86

[Text] Buenos Aires, 15 October (TELAM)--The National Commission for Atomic Energy (CNEA) tonight made it clear that the theft of equipment used to produce Technetium-99 from an unofficial vehicle is not cause for concern because the equipment has a low radioactivity level.

The CNEA thus responded to initial reports that Dr Ana Baigorria, an expert in nuclear medicine, had reported the theft today in Monte Grande. According to police leaks, Baigorria reported the theft of a dangerous radioactive material, which could provoke high-risk environmental pollution, from the trunk of her Volkswagen car, which was parked at the intersection of Rodriguez and Yrigoyen Streets, within the jurisdiction of the 1st police precinct in Esteban Echeverria.

After being informed of the theft of the equipment used to produce Technetium-99, the CNEA reported in a communique that the equipment is currently used in nuclear medicine to conduct diagnostic procedures in which the radioactive material is administered to the patients.

The CNEA explained that the radioactive material contains approximately 100 milicuries and weighs less than 10 milligrams. An adequate shield ensures the safe use and transportation of the equipment with no risk whatsoever. On the outside of the container there are labels identifying the radioactive nature of the equipment.

In view of the low radioactivity of this substance and the safety shield surrounding it, this incident is not a cause for concern. Notwithstanding the CNEA has undertaken appropriate actions to determine responsibility in this case, the CNEA stated.

In conclusion, the CNEA has asked anyone having information on this matter to telephone the fire department of the Federal Police, radiologic protection section. The number is 21-2222.

/12913
CSO: 5100/2025

ARGENTINA

BRIEFS

CNEA SALE TO PRIVATE COMPANY--Buenos Aires, 14 Oct (DYN)--The National Commission for Atomic Energy (CNEA) today sold 500,000 curies of Cobalt 60 to the SMET [expansion unknown] company. The material will be used in the first private radiation plant to be built for medical purposes and for preserving foodstuffs in the country. [Excerpt] [Buenos Aires DYN in Spanish 0009 GMT 15 Oct 86 PY] /9274

CSO: 5100/2029

BRAZIL

MINISTER COMMENTS ON AERONAUTIC, NUCLEAR R&D

PY221111 Sao Paulo FOLHA DE SAO PAULO in Portuguese 19 Oct 86 p 8

[By Dalton Moreira, from the Valle do Paraiba branch office]

[Text] Aeronautics Minister Octavio Moreira Lima, 60, stated on 16 October that "government policy today calls for the development of nuclear technology, but exclusively for peaceful purposes," in accordance with the "basic guidelines set by President Jose Sarney." The minister added, "research is being conducted at the laboratory level. This will help Brazil to master advanced technology, but not for military purposes."

In an exclusive interview granted to FOLHA DE SAO PAULO, from his office in Brasilia, Moreira Lima said "any nation that wants to be considered developed must fully master three specific areas: informatics, space, and nuclear."

Research into uranium enrichment is being conducted at the Aerospace Technology Center [CTA] -- an organization headquartered in Sao Jose dos Campos (Sao Paulo) and linked to the Aeronautics Ministry -- through the Advanced Studies Institute [Instituto de Estudos Avancados -- IEAV]. The minister stated "nuclear research requires a large number of physicists, specialized engineers, and large investments. And we do not have them yet. This research also demands a technology which we have yet to develop, because nations which posses that technology will never transfer it."

Regarding the use of the military base installations in Serra do Cachimbo, Moreira Lima said "Brazil has very few testing grounds for its equipment," and that "Serra do Cachimbo is an uninhabited and barren region, since it lacks mineral resources which could be exploited. The land is not suitable for agriculture or for raising livestock. It is an ideal ground for testing weapons. Enterprises such as Avibras [Brazilian Airspace Industry] and Engesa [Specialized Engineers, Inc.] have expressed interest in using it." Although the land belongs to the Armed Forces Staff [EMFA] the area has been under the responsibility of the Aeronautics Ministry since the 1970's.

The subsonic fighter-bomb AMX, manufactured jointly by Brazil and Italy, will be tested this year at the Serra do Cachimbo base, according to the minister. this aircraft will go into service with the Brazilian Air Force in 1989. "We are in the final stage of preparing for tests with rockets and attack aircraft in the area reserved for that purpose," he stated. According to him, the military personnel living in that base are about to complete construction of a 300-kw hydroelectric plant that will supply energy to the base installations. For the time being, we are only doing that there." [quotation marks as published]

After 5 years in Serra do Cachimbo building wells for testing nuclear devices, and domes (for dumping nuclear waste), the CTA people left the area in July 1985. Now, the base is under the control of the Aeronautics Ministry Research and Development Department. According to Moreira Lima, "the CTA did nothing more in Serra do Cachimbo than to prepare the area for research and tests. This was preliminary work carried out by CTA technicians, preparatory work," he added.

Over the past few years considerable sales of Brazilian war materiel, to Saudi Arabia, Iraq, and Turkey, a market considered to be exclusively the domain of the great powers, represents for the minister a way to generate employment opportunities, in addition to making a "contribution to even up our trade balance," regardless of the criticisms of peaceful organizations. He added "the development of our country in terms of mastering advanced technology," is something which is "generally transferred to civilian use. Obviously there are those who criticize this, but we have to be realistic: the whole world needs weapons to maintain their Armed Forces on a professional level." For him, the great powers have achieved such a high level of technology and their products are so advanced that very few countries can purchase them. "In this manner, the so-called traditional equipment was no longer being produced by them" and the Brazilian businessmen "know how to exploit that empty space." He added: "Our products, in addition to being of excellent quality, are cheap."

By the end of 1989 Brazil will have placed in orbit its first data collecting satellite, which is being developed by the National Institute for Space Research (INPE)- The Air Force is participating in this project -- which is called Complete Brazilian Space Mission [Missao Espacial Completa Brasileira] (MECB), under the responsibility of the EMFA -- with the construction of a launching center and with the manufacture of the Satellite Launching Vehicle (VLS).

Regarding the base, which will be installed in Alcantara, Maranhao State, Moreira Lima has said "its construction is contemplated within the scheduled plan. We are now appropriating the land from the families that are residing within the future center's perimeter. We have already asked for bids and the construction of the base will begin in 1987." The same firmness cannot be observed about the deadlines for the construction of the VLS. Since the end of September the Institute for Space Activities (IAE) has been running into difficulties: Various types of experts have left the institute for better salaries. In view of this factor, the MECB runs the risk of being delayed.

Although Moreira Lima does not believe the project will be delayed, he does admit the IAE's brain drain is due to low salaries. The same thing happened at the INPE during 1985. "Regarding the development of the VLS, the only difficulty we are facing is the run on technicians and engineers, who have been lured away by private enterprises that pay better salaries." The minister also said the government has been warned of the need to update salaries, although he believes they will never equal those paid by the private sector. "But, if at least we can come close to them we will be in a position to maintain our team. That is our concern, because they are very experienced men." Regarding the MECB, he said that "it is a problem that is causing us grave concern."

/9716
CSO: 5100/2026

BRAZIL

NUCLEBRAS OFFICIAL CITES NO CURRENT INTEREST IN REPROCESSING

Sao Paulo FOLHA DE SAO PAULO in Portuguese 7 Sep 86 p 11

[Text] Rio--NUCLEBRAS director of nuclear fuel, David Simon, said the day before yesterday that "the existence in Brazil of a parallel nuclear program that is beginning to be publicly admitted can generate doubts and restrictions on the part of the German partners of NUCLEBRAS' official nuclear program. In an exclusive interview with FOLHA, Simon complained about the "foot-dragging" pace at which the government is releasing the appropriations for construction of the Angra II and III plants and said that NUCLEBRAS' position on the matter, already expressed to the government, is that "either the program be carried out at a managerially responsible pace or not at all."

He revealed also that the government will "shortly" decide whether to accept the suggestion of the Commission for Evaluation of the Nuclear Program, that NUCLEBRAS--which is subject to the safeguards of the International Atomic Energy Agency (IAEA) that prohibit the use of nuclear technology for military purposes--and the Institute of Energy and Nuclear Research (IPEN) "join efforts" to convert yellow-cake (unenriched uranium) into uranium hexafluoride (uranium gas which will be enriched and resolidified).

According to Simon, IPEN has already succeeded in achieving that conversion "although not yet on an industrial scale." He declared that the decision on the matter will be "eminently a sensitive political decision because it implies leading NUCLEBRAS to depart from international safeguards and, in this particular case, to use a genuinely national technology developed under the parallel program."

The director of the state enterprise was one of the persons who drafted the Brazilian nuclear program based on the agreement with Germany. In 1976, after working for 3 weeks in setting up Nuclebras Engineering Corporation (NUCLEN), he broke with the Brazilian nuclear program because he considered that the company was creating "a climate of antagonism toward Eletrobras," a state enterprise where he had also worked, and because he believed that the initial aim of the program to build eight nuclear plants by 1990 "was not grounded on the economic reality and energy needs of Brazil." Invited to return to NUCLEBRAS in May, Simon accepted "because the program had been scaled down and I consider the schedule to complete Angra II by 1992 and Angra III by 1995 to be quite reasonable."

In his opinion, the government option to build Angra III "will keep NUCLEBRAS from being abolished--which would have occurred if the plants were not built --enabling the electric market between 1993 and 1994 to demand a new plant for the year 2000, as is my belief."

Within the program developed by NUCLEBRAS, there is one phase of the nuclear fuel cycle in which the company has no interest at the moment: reprocessing uranium. "To do this in order to reuse the uranium and the plutonium as new fuel for the plant has already been confirmed universely to be uneconomical. The United States, for example, has already decided not to reprocess uranium any longer. It has stored the material until a less expensive method than the so-called Purex process--the only one known--is discovered 30 or 40 years from now. I even believe that when that technology is discovered it will not be economically feasible for such small programs as the Brazilian one."

He was asked, since reprocessing is not economically feasible and it was being researched in the parallel program, whether this meant that plutonium is being sought for military devices. Simon said that he would prefer not to answer: "I only know about the official nuclear program: the NUCLEBRAS program.

Simon said also that NUCLEBRAS is not performing the reconversion of enriched uranium gas into powder and then into pallets; that they are being bought from the European consortium Urenco (Germany, Britain, and the Netherlands), which enriches the uranium by the ultracentrifugation method. Ultracentrifugation is the goal of the parallel program research. According to him, it is the recommendation of the Commission for Evaluation of the Nuclear Program that NUCLEBRAS commission that conversion by 1990, "but financial resources are needed for that, something we do not have at the moment."

According to the director of the state enterprise, the company is "at zero, without any money; only with lines of credit open abroad." He said that the appropriation "considered for next year is simply ridiculous: 200 million cruzados, which is just enough to cover 3 months of our payroll."

It was in that circumstance, according to David Simon, that NUCLEBRAS told the government: "Either the release of funds accompany the political decision already taken to build Angra II and Angra III, or it would be better to stop everything." He said that, as a matter of fact, in the present situation NUCLEBRAS is being led into "dangerous idleness in which the guarantees on already purchased equipment are expiring and it has not even been installed." It was idleness that led Nuclebras Heavy Equipment Corporation (NUCLEP) to seek new sources of income, such as shaping plates for a Navy submarine.

Despite the lack of funds, NUCLEBRAS is installing a 24-stage cascade in Resende (161 km from Rio) for the enrichment of uranium through the centrifugal jet process, to go into operation next year. An experiment with one stage was conducted in Germany and, according to Simon, it worked. If this first cascade works, the cost of enriching uranium by this method will be analyzed and the government will decide if it will install a 480-stage cascade at a cost of $1 billion (13.8 billion cruzados) to enrich uranium at the percentage level necessary for the operation of the plants.

8711/7051
CSO: 5100/2005

BRAZIL

PROBLEMS, ACHIEVEMENTS IN PROGRAMS WITH ARGENTINA, PRC

Nuclear Weapons Prospects

Sao Paulo TECNOLOGIA & DEFESA in Portuguese No 31, 1986 pp 20-25

[Article by Roberto Lopes]

[Text] The armed forces of Argentina and Brazil, following the same path, must enter into the nuclear era. Although both these countries are pursuing their research in the atomic energy sector for civilian purposes on a priority basis, both are also planning, as a first step toward the definitive sophistication of their military establishments, to build nuclear submarines.

The Brazilian authorities are unanimous in admitting that although Brazilian technicians can be regarded as the equal of the Argentines in terms of scientific training, the Argentine nuclear program has in the past 20 years had greater continuity than that in Brazil. Despite the political turbulence, Argentina has succeeded in maintaining a level of priority for its research in the atomic field which has guaranteed an adequate level of resources for the sector.

The Argentines opted for Canadian technology and oriented their research toward so-called "natural uranium," developing industrial plants using heavy water. This system is regarded by the Brazilian military as less stable, or in other words, as a system involving greater risks than the Brazilian choice based on German technology.

A part of Brazil's lag in the nuclear sector as compared to Argentina can also be attributed to the major change which occurred in the development of this research when an agreement with Germany replaced Brazil°s previous cooperation with the Americans. At that point, the Angra I plant using Westinghouse technology was already an irreversible project, but this did not prevent Brazil from adopting the German experience.

The Brazilian government decided on the change when it was realized that the American technology had lost out on the world market to its European competitors, and that plants like that of Westinghouse were much smaller, and also offered less in terms of the availability of replacement parts, than those in Europe.

The plant using German technology had a serious disadvantage from the economic point of view, since it requires an expenditure of electrical energy which could be termed abusive, but the guarantee the Germans offered on the transfer of technology, along with the political atmosphere of greater confidence, led Brazil to sign a nuclear agreement with Germany.

Argentina gave definitive impetus to its research in the nuclear sector when it installed a reactor for the production of radioisotopes at the Constituyentes Atomic Center. Adm Castro Madero was appointed to head the nuclear program, and the next step was the construction of an electrical generator plant powered by atomic energy in Atucha.

Three years ago the Argentine government announced it had mastered the technology for enriching uranium, but after some research, the Brazilian authorities concluded that even though the Argentine research had been successful in laboratory tests, this process might still involve some problems if transferred to an industrial plant.

Although Brazil's National Intelligence Service (SNI) had established a whole structure to support the Brazilian-German Nuclear Agreement 10 years ago, the Brazilian military pursued their own research in the atomic energy field at the Sao Jose dos Campos Technical Aeronautics Center. However, at the beginning of the 1980s, the navy decided to transfer its research in this sector to the University of Sao Paulo, establishing closer relations with the Nuclear Research Institute (IPEN).

The change on which the navy decided was the result of a disagreement with the air force on the method of enriching uranium developed at the Sao Jose dos Campos Aeronautics facility, using laser beams.

The navy oriented its efforts toward the goal of building the so-called "compact reactor," which will serve as the propulsion mechanism for the first Brazilian nuclear submarine. The design for this vessel will only be completed during the first half of the coming decade, when the weapons systems, sensors and other electronic components designed for a naval warfare scenario as of the end of the century have been evaluated.

Argentina too is interested in a nuclear-powered submarine, but neither the Brazilian nor the Argentine plan calls for the installation of nuclear missiles on board these vessels.

Two of the four tasks which might be assigned to the Brazilian submarine fleet by the naval general staff could not be carried out without nuclear submarines. Such a plan would make Brazilian submarines responsible for:

1. Controlling the maritime trade routes of interest to Brazil;

2. Projecting the domestic military power on land;

3. Structuring the country's strategic deterrent force; and

4. Preventing any future enemy of Brazil from making use of the seas.

Without nuclear submarines, the task of projecting the national military power on land and ensuring a deterrent force would be jeopardized, in both cases by the lack of ballistic missiles equipped with nuclear warheads which could be launched from such vessels.

As the Brazilian naval effort is not in principle oriented toward a nuclear submarine equipped with nuclear weapons, the Brazilian plan will achieve the limited purpose of deterring any presumed enemies from making an armed attack on our sovereignty. The Argentines were able to confirm the importance of nuclear submarines during the Falkland crisis in the first half of 1982.

It was one of these vessels in Her Majesty's Navy which sank the Argentine cruiser General Belgrano in the bloodiest sea battle in the whole of the conflict. The Belgrano was the flagship of a small Argentine naval task force, and its sinking meant the end of almost all of the offensive missions of the fleet commanded by Adm Jorge Isaac Anaya. After this loss, the Argentine vessels limited themselves to unimportant coastal patrols which, carried out in shallow water, involved no risk of an encounter with a nuclear enemy.

After the war, Argentine naval officials admitted that they were unprepared for a confrontation with British nuclear submarines. Argentina was even uncertain as to what the consequences of a battle which might result in the destruction of a British submarine would be. Many people in Buenos Aires believed that such an incident would release radioactivity which would threaten the Argentine coast.

Moreover, both Argentina and Brazil considered developing missile units with nuclear warheads for practical and strategic missions. While the Argentines concentrated these studies in the army, in Brazil it is the air force which has been developing the vectors which would initially be capable of carrying a nuclear warhead.

The FAB believes that it has now achieved reasonable mastery of the technology of the solid propellants used in the scientific research rockets of the Sonda family, but it admits to encountering difficulties in the use of liquid propellants, which are much less stable and more powerful. In the army, there is doubt about the real Brazilian capacity even where solid propellants are concerned.

However, Brazil is farther ahead in the technology of missile production than Argentina. The Falklands war illustrated this. Neither the Argentine air-to-air missile project (the "Martin Pescador") and the missile designed for use on land (known as the "Mathogo") has yet developed beyond the prototype stage.

Although it is entirely oriented toward the Brazilian space program, which calls for its use as the launch vehicle for a Brazilian satellite, the Sonda IV rocket is the star of the domestic aerospace program today. Its conversion into a vector for the transport of a nuclear warhead would, however, entail the development of a so-called "guidance panel," the equipment which would make this vector into a "smart missile." The army, desirous of developing conventional missiles, has sought the technology for such "guidance panels" in other countries. Recently, the minister of army, Gen Leonidas Pires Goncalves, has pursued talks in Sweden with a view to initiating cooperation to ensure the transfer to Brazil of Swedish experiments with a "panel" developed by the Japanese which would give the missile three systems for evading antimissile missiles. The Exocet, used with success by the Argentines in the Falklands war, has only one "evasion point."

However, fuels and the guidance panel are but two of the problems to be resolved in connection with the development of missile units with nuclear warheads. The problems in arming these warheads, as well as the installation of the missiles, which would require special silos in areas of strategic interest, have led the Brazilian authorities to conclude that the incorporation of these weapons in the domestic arsenal will not be possible until toward the end of the century.

Developing countries such as Brazil and Argentina, with limited military capacity even for purely defensive operations, encounter still another problem in connection with the use of tactical nuclear weapons. It is the development of a philosophy for the use of these weapons adapted to the real situation of two nations in the Third World, which are moreover located in a region geographically distant from the areas of East-West confrontation.

At the beginning of the 1980s, major American military facilities such as the Nuclear Defense Agency and the Army Research Laboratory in Alabama attempted to define the tenuous dividing line between nuclear weapons for technical use and nuclear weapons for strategic use more precisely. And this was in a country which was not only one of the three leading economic powers in the world, but was also the nation with the longest experience as a user of nuclear weapons.

The philosophy of use must be understood to mean the choice of a given type of nuclear weapons, their placement at a given point on the national territory, and a decision as to the purpose of their use--in other words, against what country use is planned. American studies today conclude that the development of a philosophy for the use of nuclear missiles takes 10 to 15 years. These same studies, moreover, have already led the American army to establish a methodology for the use of tactical nuclear weapons by units on the brigade, and even the battalion, level.

Among the many problems involved in planning the use of tactical or strategic nuclear weapons, none is greater than choosing to engage in aerial bombing. A nuclear payload in the belly of an aircraft requires a military infrastructure which is simply unimaginable for two nations such as Brazil and Argentina, which have armed forces suited only to what is known as "limited warfare," that is to say that in which the major powers and their formidable arsenals are not involved.

Argentina came to have a strategic air force, but this was in the postwar period, when it purchased some old four-engine British bombers. A strategic force no longer requires a "flying fortress" (the name the Argentines pompously gave their rickety two-engine "Pucara" fighter) or the B-52s, which were famous in the days of the so-called "cold war." But although the size of airplanes has been reduced, their destructive power and their electronic equipment have reached levels of sophistication which exclude any possibility of improvisation.

Long before they have an atomic bomb, Argentina and Brazil need to develop their armed forces in the realm of electronic warfare and satellite communications, which are absolutely vital in today's conflicts. For a country such as Brazil which still has difficulty assigning its army units--conventional, obviously--in suitable fashion, or a nation such as Argentina, whose army has never studied land warfare in island areas, despite the raging national passion concerning the Falkland Islands, the use of nuclear weapons seems too great a leap.

However, it is necessary to note the determination of these two countries to maintain an independent position on the nuclear issue. It is this which has led them to refuse systematically to sign the Tlateloco Treaty on the nonproliferation of nuclear weapons in this part of the world, and it is this which has also led them to ignore certain evidences of fear on the part of the State Department whenever the issue of the development of their armed forces in the atomic field has come up.

Unfortunately for the American diplomats, a country as vast as Brazil has, as might well be imagined, reasonable uranium reserves in its subsoil. In only two municipalities in Brazil--Itataia, in Ceara, and Lagoa Real, in Bahia--there are almost 245,000 tons.

Brazilian-Chinese Agreement

Sao Paulo TECNOLOGIA & DEFESA in Portuguese No 31, 1986 p 24

[Article by Paulo Mena Barreto]

[Text] Brazil and China have signed an agreement for cooperation in the aerospace field involving the Chinese Central Space Agency and the Technical Aerospace Center, through the Aerospace Research Institute. The agreement, on which preparations began in 1982 and which was signed by the director of the CTA, Brig Gen Hugo Piva, at the end of 1983, covers an exchange of fuel technology and guidance systems in the civilian and military sectors.

Basically, the Chinese are interested in Brazil's solid fuel technology, one of the best alternatives in existence for military use. Currently, the whole of Beijing's deterrent force is designed for the use of liquid fuel, despite all the difficulties in handling and storage this entails.

Apart from the purely practical factors, there is another of a strategic nature which should not be overlooked. The reaction time for a missile with solid fuel only half that of a missile with liquid fuel. This fact could mean the vital difference in whether or not a nuclear umbrella has credibility.

On the other hand, the Chinese technology in microelectronics ranks among the most advanced in existence today. In the field of data processing, an essential tool for success along new military or civilian paths, Brazil has better mastery of the manufacture and structure of computers and digitalized components. The two fields complement one another, and the scientists and military leaders in the two countries were not slow to understand this fact.

This microelectronic technology is seen in better and lighter guidance systems. Brazil's greatest interest is in the design and manufacture of control panels for missiles, an alternative which depends on a step to be taken by Argentina or South Africa.

Another advantage for the Brazilians would be the development of the new satellite-launching vehicles. The Chinese liquid-fuel rockets are among the best available on the international market. It would be well to recall that after its third consecutive failure following the Challenger mission, NASA, in the United States, turned to People's China when it needed to launch another civil communications satellite.

The VLS developed on the basis of the Sonda IV could serve as the foundation for an excellent strategic ballistic missile, but as a space rocket, it will always have limitations in force and thrust which will not easily be resolved. The only alternative to a liquid-fuel rocket would be to equip the VLS with dozens of auxiliary rockets, a clumsy and heavy business, as well as hardly reliable.

Even if Argentina and Brazil do not have their bombs, it will be necessary to develop an advanced space program capable of managing the animal, vegetable and mineral wealth of the country. This aspect alone justifies the agreement with China, apart from the clear benefits offered to the Brazilian military programs.

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CSO:5100/2012

BRAZIL

NUCLEAR PROGRAM LOSES 'PRIORITY' IN BUDGET CUTS

PY231807 Paris AFP in Spanish 0121 GMT 22 Oct 86

[Text] Rio de Janeiro, 21 Oct (AFP) -- Brazilian Mines Minister Aureliano Chaves today said to the local press that the nuclear program has not been granted a priority status in the 1987 Brazilian Government budget.

Chaves made this statement during a meeting with Nuclebras [Brazilian Nuclear Corporations, Inc.] Director Ronaldo Fabricio, who resigned his post because of budget cuts to the 1987 nuclear program.

Chaves said that he cannot pressure ministers in the economic sector to hand over nonexistent resources. He added that because of a lack of resources, the government query has established priorities for its investments, and the nuclear sector is not among them.

Chaves said that the Brazilian nuclear program will not be paralyzed but he added that the implementation of the program will be compatible with the resources available.

Ronaldo Fabricio said that the Angra II nuclear plant, the first in a series of eight plants scheduled to be built within the framework of a 1975 agreement signed with the FRG, will not be operational by 1992 as was scheduled, due to the resources that the national budget has allotted to the nuclear sector in 1987.

According to Fabricio, in 1986 we worked at a slow pace because of budget cuts in the nuclear sector which decreased from $230 million to $120 million.

The Brazilian nuclear program, which is conducted within the framework of an agreement that was signed in 1975 with the FRG, has been virtually paralyzed since the beginning of 1984 because of budget cuts in the public sector.

This agreement provides for the installation in Brazil of eight nuclear plants of 1.3 million kilowatt power each for the production of electricity. It also provides for the transference of technology to carry out all the necessary operations for prospecting, extracting and production of uranium, for the construction of an uranium enrichment plant, and for the construction of a radioactive fuel reprocessing plants.

The original Brazilian nuclear program established that the eight plants would be operational by 1990, but because of the modifications that were recently established by the Brazilian Government, there will be one plant operational by 1992 and other one by 1995. [as received]

The Brazilian Government has not yet decided whether the other six plants provided for in the nuclear program, in which $4.828 billion have already been invested, will be built.

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CSO: 5100/2028

BRAZIL

TECHNICAL, SCIENTIFIC BLOCKS TO ATOMIC BOMB PROJECTS LISTED

Rio de Janeiro O GLOBO in Portuguese 31 Aug 86 p 41

[Article by Denise Lima]

[Text] Sao Paulo--Still far from being able to develop a national technology for building nuclear plants, Brazil--at least officially--cannot even think of building an atomic bomb. That is the opinion of famous physicists such as Ivan Cunha Nascimento and Oscar Sala, director and vice-director, respectively, of the Physics Institute of the University of Sao Paulo (USP), and Claudio Rodrigues, the superintendent of the Institute of Energy and Nuclear Research (IPEN).

The fact is, however, that the subject of nuclear energy is out on the street; it arouses the curiosity and the fear of the people, nurtured by unpleasant situations such as the leakage from the Three Mile Island plant in the United States and Chernobyl in the Soviet Union. At home, many things ended up being labeled as rumors, but there are those who remember the plutonium that allegedly went directly from the IPEN to Iraq during the Maluf government and, more recently, the preparation of a military area in Serra do Cachimbo in Para intended for nuclear testing--everything duly denied.

Since the U.S. research in New Mexico and Hiroshima, of sad memory, a stigma has attached to a whole technology that can also lead the world not to a third (and final) war but, paradoxically, to a revolution for peace, contributing to the survival of mankind.

The quest for national capability in the area of nuclear technology has been the challenge of the IPEN, which marked 30 years of existence this month. "But always for peaceful applications," stressed its superintendent, Claudio Rodrigues. He discounted any plans for an atomic bomb.

"We have neither the material nor the human resources. Although the bomb is a political decision, the technical-scientific aspect does not permit us to build it. The material we have is not even sufficient to obtain Isotope 235. The uranium enriched in Resende is not even enough for Angra's needs. It is a case that requires technology and money," he declared.

Rodrigues admitted, however, that if the government had released funds during all these years, research at the IPEN would now be at more advanced stages, as is the case in Argentina, which began well after its studies. Even so, he believes that it will be possible to build a national reactor within 10 years, although with less power than those of Angra I and II. He expects independence in the area of classic energy (for peaceful purposes) will be achieved in a "reasonably short" time if the nuclear program is adapted to national needs.

The production of reactors is the IPEN's great goal and its engineers are working on a project of a so-called "critical" unit--that, that does not generate--intended for new research. The institute has already achieved the purification of uranium through sulfur hexafluoride after a lengthy effort on the development of fluorine technology, which Brazil did not have until about 8 years ago.

The IPEN has been encountering difficulties in obtaining U.S. fuel for its reactor--the first one installed in Brazil--since the Carter administration and decided to produce it. A program established for that purpose has existed for approximately 4 years. The two fuel elements that have been fueling the reactor since last year were processed there.

The raw material--enriched uranium powder--comes from abroad, supplied by the International Atomic Energy Agency. Under the coordination of the National Nuclear Energy Commission (CNEN), its experts have been researching all of the uranium enrichment processes, which in the long term may also provide autonomy in that stage. Superintendent Claudio Rodrigues declared that there is great concern about the safety factor (there is even a specific board) and about the training of human resources "directed toward national needs, both in community support activities and in the area of research."

In the work directed toward the community, the IPEN especially targets the areas of health, industry, and agriculture, supplying radioisotopes throughout Brazil. For medical purposes, they are applied in cancer therapy and even for the diagnosis of cardiac and cerebral problems. But the institute is also working with radioactive sources for gamma radiography (testing of turbines, piping) and the application of radiation to electrical cables, under factory orders, which this month amounted to more than 500 kilometers. Much nuclear energy research is being conducted in Brazil at the present time but little within the universities, in the opinion of Professor Oscar Sala, vice director of the Physics Institute of the USP. For example, Campinas State University has suspended development of the project for isotopic separation or uranium enrichment through the application of a laser to sulfur hexafluoride. The studies that had been carried out since the early seventies were turned over to the Advanced Studies Institute of the Aeronautics Technology Center and then to the IPEN after the death of its coordinator, physicist Sergio Porto in 1979.

Likewise, in the USP in Sao Carlos and Ribeirao Preto, there is no nuclear physics research, properly speaking, but parallel work. Many studies were abandoned due to the lack of appropriations from the National Nuclear Energy Commission since the political decision not to install any more nuclear plants in Brazil.

The greatest enthusiasm for that research occurs in the capital, and physicist Ivan Cunha Nascimento, director of the Physics Institute of the USP, views the Navy's interest in building a nuclear submarine as an important step. The only thing is that the vessel's reactor has to be small and consequently use highly enriched uranium, which cannot be obtained through the process currently being used. This is a task that will require much study.

Oscar Sala, a member of the Commission for Evaluation of the Nuclear Program, which suggested the completion of the Angra II and III plants, emphasized the importance of the new reactor that is being built at the IPEN, even though of low power; but he discounted, at least in the short term, the possibility of achieving a national nuclear plant project.

"We would have to have project engineering and Brazil does not yet have the necessary conditions. That is going to depend on an explicit political option and may be 10 years away. As for the atomic bomb, the prospects are more remote and I hope that we will never be in a position to achieve it," he declared.

Nevertheless, in Sala's opinion, the mastery of nuclear technology is irreversible. But, as he noted, it is necessary to eliminate negative points, "especially as regards safety, because there are risks as in every new technology."

8711/7051
CSO: 5100/2005

BRAZIL

CNEN DEATHS PROBED; RESEARCH ACTIVITIES DESCRIBED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 24 Sep 86 p 14

[Article by Jose Roberto Arruda]

[Text] Has the parallel nuclear program already caused the death of six persons by cancer due to exposure to radioactivity and the bad working conditions? To respond to that question, the chairman of the National Nuclear Energy Commission (CNEN), Rex Nazare Alves, created a 12-member task force comprised of doctors and specialists in labor medicine and ergometrics for the purpose of presenting, within 30 days, a statistical survey of the work ailments acquired by CNEN employees during the past 10 years.

The CNEN Employees' Association (ASSEC), which made the accusation about those deaths and has instituted legal actions in the labor courts--which are proceeding in the 5th, 7th, 8th, and 10th Federal District Courts--deplores the fact that it was not called upon to participate in the task force. The ASSEC is also asking for the immediate division of the CNEN, as was proposed by the commission of scientists that evaluated the nuclear program, to prevent fuel cycle research activities from continuing to operate in conjunction with those of a simple licensing and inspection bureaucratic agency, since the laboratories and reactors do not offer the necessary protection and safety.

The ASSEC suspects that from 1982 to last year six persons died in the Nuclear Engineering Institute (IEN) on Fundao Island and that those deaths may be associated with their work routine. Three other, not yet fatal, cancer cases appeared at the IEN last year. Those who died were: Tome de Menezes, Waldemiro de Souza Leite, Haroldo de Oliveira Borges, Carlos Augusto Camacho, Josefa Emilia da Silva, and another person named Higino whose full name the technicians could not recall during the interview. The common link in the investigation the ASSEC is conducting on its own is that, in one way or another, the six worked on the Argonauta reactor; Higino and Haroldo de Oliveira Borges only on the installation of that reactor.

Josefa Emilia da Silva was the charwoman who cleaned the rooms of the IEN and the Argonauta reactor room. Haroldo used aniline, a highly carcinogenic substance, in his work making printed circuits for TV and electronic instrumentation in the nuclear area. After he died of cancer, he was replaced in that job by Higino, who died a short time later. The third person in the IEN Department of Instrumentation and Control, who replaced Higino, also contracted cancer and is undergoing medical treatment.

The ASSEC is demanding a broad survey of the working conditions of all the workers at IEN, the Institute of Radiological Protection and Dosimetry (IRD), the Institute of Energy and Nuclear Research (IPEN) of Sao Paulo and the headquarters of the National Nuclear Energy Commission itself. According to the CNEN Employees' Association, that survey would have to be conducted by a neutral, independent team that will have access to the medical files, that can compare them to the operational files, that will conduct some parallel investigations and try to identify anomalies that have been pointed out for some time by the employees.

The ASSEC does not believe that a medical team comprised of employees of the CNEN itself will have the necessary impartiality to act because the CNEN management treats that case as if it were a simple wage demand, a struggle for hazardous duty pay differential, when the ASSEC's struggle--besides that pay differential--is for better safety conditions on the job. The ASSEC believes that its colleagues in that task force may be subjected to coercion.

In the event that that task force is maintained, the ASSEC wants to participate in it and suggests some investigative methods. For example, that an inventory be made of all radioactive substances or chemicals harmful to human health commonly used in the work place; that a broad survey also be made of the storage conditions of those materials (including cobalt, cesium, radium, beryl, iridium, thorium, uranium, and very dangerous chemical substances); and that an investigation be made of whether international safety standards for handling them are being observed.

Contradiction

The ASSEC shows that there is a very great contradiction stemming from the fact that the CNEN is its own inspector; that is, that the supreme agency charged with radiological protection and safety does not adopt safe, effective, and modern methods in its own shop. So how can it oversee the other agencies that operate in the nuclear sector or that use radioactive products? ask the CNEN employees. Consequently, the CNEN Employees' Association is asking for the division of the agency in the manner proposed by the commission that evaluated the nuclear program, creating a National Radiological Protection and Nuclear Safety Commission, attached to the Presidency of the Republic, for the licensing and inspection regulatory functions currently exercised by the CNEN, Sipron and Copron. At the same time, a National Nuclear Research and Development Commission would be created to manage the parallel program, which could be attached to the Ministry of Technology or the Ministry of Mines and Energy.

That demand is based on the fact that research to develop the fuel cycle technology is conducted in all of the institutes connected with the CNEN. In all those places, there are badly installed laboratories, reactors, and radiating materials that are not always being handled with the necessary safety precautions. People from the bureaucratic sector pass through those places and are not always aware of the danger they are running and what is the best way to protect themselves radiologically. Added to that is the fact that the CNEN is its own inspector and that in those years of authoritarianism and the fact that it conducts research in the nuclear sector, its employees cannot talk [as published].

Operating in the IEN in addition to the Argonauta research reactor is a cyclotron, a particle accelerator that produces radioisotopes for medicine, agriculture, and industry. The employees allege that that cyclotron has been working almost continuously, without interruption, on the production of radioisotopes. Thus, radioactivity at that site reaches high levels. Two or three days' of complete stoppage of the cyclotron's activities are necessary to clean it, but that is not being done. They are doing the cleaning with the cyclotron in operation, using one employee for a few minutes, then replacing him with another, and so on, to reduce the level of exposure. The IEN employees are alarmed over this.

The IEN is also developing a fast-breeder reactor project, with experts sent to Italy and the purchase of $15 million worth of equipment, basically experimental cooling circuits and 12 tons of liquid soium. It is carrying out a small research reactor project and a chemical uranium enrichment process along the same line as a method of uranium enrichment successfully developed by the Japanese Government. The IEN also makes analyses of radioactive minerals.

The Instiutte of Radiological Protection and Dosimetry (IRD), on the Avenue of the Americas, Tijuca Bar, is developing a laboratory-scale process for separating UF4 (uranium tetrafluoride), conducts the environmental monitoring of Pocos de Caldas and the Admiral Alvaro Alberto nuclear complex, and examines imported food to measure radioactivity from the Chernobyl accident in the Soviet Union. Thus, it has a chamber of sources of radioisotopes, with sources of neutrons and other radioactive materials used to calibrate sensors, detectors, and dosimetric testing.

The National Nuclear Energy Commission also has experts and scientists working in the Army Technological Center (CETEX), in Marambaia Marsh, where research is being conducted with a graphite-moderated, gas-cooled, plutonium-generating reactor, in addition to continuing research with unltracentrifuges for uranium enrichment in the Institute of Energy and Nuclear Research in Sao Paulo.

The task force appointed by the chairman of the CNEN, Rex Nazare Alves, is headed by CNEN doctor, Manoel da Nova Castello Branco, and comprised of the following members: Armando Silveira Mello (CNEN doctor), Diana Maria Tavares Campos (IRD doctor), Fernando Pontes Moreira (IEN doctor), Florentino Neves Pereira de Macedo (CNEN doctor), Francisco Laecio Lins (IRD doctor), Jesse James Gomes da Silva (IEN researcher), Marcos Schuetz Jardim (IEN doctor), Narcisio Guedes (IEN doctor), Nilson Reis Cardoso (IRD doctor of labor medicine), Paulo Goncalves da Cunha (IRD researcher), Yannick Odetes Jacqueline N. Gomes dos Reis (IRD researcher).

Even if ASSEC--an organization that embraces 80 percent of the employees of the CNEN and the other affiliated agencies--should be invited to participate in that task force, it will continue its own investigations. It is going to send questionnaires to all [employees] and ask for the monitoring of everyone who deals with radioactive sources, as well as proceeding with its legal actions in the federal courts.

Physicist Denies Risk to the Environment

Nuclear physicist Ruth Klawa, a CNEN aide, said in the governor's palace yesterday that "the construction of the plant itself impedes the escape of radioactive material into the environment because there is a system that controls the nuclear plant which acts as a barrier to that material." With regard to accidents, she said that, in the short period that it remained in operation, the Angra dos Reis nuclear plant has already had eight "unusual incidents," which are internal problems related to its reactor but which did not become serious situations. In the meantime, CEDEC is prepared to reformulate its emergency plans.

8711/8918
CSO: 5100/2008

POSSIBLE RADIOACTIVE WASTE DUMP SITES CHOSEN

PY211155 Rio de Janeiro O GLOBO in Portuguese 18 Oct 86 p 16

[By Paulo Motta]

[Excerpts] From the 17 areas initially considered, the National Nuclear Energy Commission (CNEN) has already chosen 5 for the final storage of atomic waste from the Angra 1 nuclear plant. These areas are located in regions receiving little rain and having small population in northern Rio de Janeiro (1), Minas Gerais (1), Bahia (2), and Pernambuco (1). The so-called "prospective areas," which add up to 11,500 square kilometers have already been staked out in those regions. The atomic waste may also end up on the bottom of the ocean or on the Martim Vaz and Trindade Islands.

Other states that have possible areas that could serve as atomic waste dumps are Paraiba, Rio Grande do Norte, Ceara, and Piaui. However, "prospective areas" have not yet been staked out in these states. Three locations off the coast of the southern and southeast regions of Brazil have already been chosen as possible underwater dump sites. The CNEN will now make a detailed study of those areas, and in 4 years, intends to submit to the federal government three areas that fully meet all the requirements for atomic waste dumps. The final decision will be a political decision, but, in compliance with President Sarney's directives, the population and authorities of the states, as well as the scientific community, will be consulted.

The search for atomic waste sites began in 1978, but it was only 2 years ago that the effort was made in earnest. Following methods used by the U.S. Nuclear Regulatory Commission and recommendations from international organizations, such as the International Atomic Energy Agency, a group made up by geologists, two meterorologists, a hydrologist, and a geographer began to survey the entire country, following criteria based on environmental, economic, engineering, land use, social, and institutional factors.

The three areas being considered for underwater disposal of atomic waste are located off the Sao Paulo coastline, 300 km from Angra dos Reis, at a depth of 3,800 meters; on the same latitude, 900 km off the coast, 4,800 meters deep; and off the coast of Santa Catarina and Rio Grande do Sul, 1,200 km from Angra dos Reis, at a depth of 4,000 meters, in the central part of the Rio Grande submarine height. The CNEN will drop containers on the first two sites to test the effect of corrosion and the resistence of the material to pressure.

/12232
CSO: 5100/2024

ANGRA I FACES ONGOING OPERATING PROBLEMS

PY221833 Rio de Janeiro O GLOBO in Portuguese 19 Oct 86 p 29

[by Paulo Motta]

[Text] Despite the fact that it began to operate commercially in January 1985, the Angra I nuclear plant has already had to change the 48,000 rods on its steam condensor (one of the factors that caused it to close down in January of that year), and now it will have to change the system that it uses for storing radioactive waste. The purchase of the new equipment alone (excluding the cost of installation), will cost approximately $6 million (84 million cruzados).

The rods had to be changed because they were corroded and covered in barnacles. Furnas technicians at that time stated that the chemical treatment used by Westinghouse in the steam generator caused the corrosion. Other experts have guaranateed that the problem was caused because the U.S. enterprise had planned that the plant would use fresh water in its refrigeration system (like many plants use in the United States), but sea water is used here in Brazil.

The system for storing radioactive waste will have to be changed because the current system dates from the 1960's. Since that time, this sector has developed greatly and the radioactive waste produced at Angra I does not comply with the standard guidelines of the IAEA nor of the National Nuclear Encergy Commission [CNEN]

The so-called low and medium-activity system of stabilization of radioactive waste [sistema de imobilizacoa dos rejeitos radioativos de Baixa e Media atividade] of the Angra I plant is really a process through which nuclear waste is placed in drum cylinders for their future final storage in a deposit to be built by the CNEN. Before it is placed in drums, the radioactive material is mixed with concrete and vermiculite so as to avoid leads of radioactive waste. Nevertheless, the system used by Angra I is outdated and it does not meet the present IAEA or CNEN specifications.

Alfredo Trajan Filho, chief engineer of the Furnas power plant division, recently admitted that the company did not replace the nuclear waste processing system within the deadline established by CNEN. He explained that the difficulties of adapting a new system to the present processing equipment. According to the CNEN, the system should have been replaced within a 2-year period after the plant entered a critical state, which occurred in March 1982.

Trajan reported that since we were unable to meet the deadline, we built a temporary deposit to store radioactive waste. This was done in compliance with CNEN and national and international security measures. The present stages of storage of radioactive waste are perfectly safe and safeguards the environment, the population, and plant employees. We have already bought a new processing system. Its cost totals $800 thousand and it will be in operation by the end of next year.

Trajan added that the new unit will yield a smaller volume of nuclear waste than produced by the present system. He said that the present temporary deposit that was built near Angra I has a capacity to store 4,000 barrels of nuclear waste of low and medium activity and that it can store Angra I nuclear waste for 3 or 4 more years.

/9716
CSO: 5100/2028

URANIUM RESERVES ESTIMATED AT 300,000 TONS

PY211335 Paris AFP in Spanish 2219 GMT 20 Oct 86

[Text] Rio de Janeiro, 20 October (AFP)--It was officially reported in Rio de Janeiro today that the Brazilian uranium reserves, which were checked by geologists from the state-owned enterprise Nuclebras, are estimated to be over 300,000 tons.

In statements published in the NUCLEBRAS BULLETIN, Nuclebras President Licinio Seabra added that the probable Brazilian uranium reserves range from 1 million to 2 million tons.

According to Seabra, 300,000 tons of uranium would permit 14 nuclear power plants of 1,300,000 kw each to generate electric power for 30 years.

In addition, Seabra said that as a result of budget cutbacks, implementation of the Brazilian nuclear programs' uranium prospecting activities have been paralyzed.

The Brazilian nuclear program, which is being implemented within the framework of an agreement signed with the FRG on 27 June 1975, has virtually halted since early 1984 as a result of a cutback on public expenditures.

Two of the eight 1,300,000 kw-nuclear power plants which were scheduled to be built in Brazil through 1990 with FRG technology, will become operational in 1992 and 1995. However, the date for building the other six nuclear power plants has not been set.

/12232
CSO: 5100/2024

BRAZIL

BRIEFS

SEABRA ON INADEQUATE FUNDS--The president of NUCLEBRAS, Licinio Seabra, yesterday told Minister of Mines and Energy Aureliano Chaves that that company's situation is dangerously approaching the "point of exhaustion" because of the lack of definition by the Planning Secretariat of appropriate sources of funds necessary for its survival and fulfillment of the minimum nuclear program. NUCLEBRAS does not have its own funds, depending entirely on the National Treasury or the international banks for its operation. In order to proceed with the schedule decided by President Sarney on 6 August, to build Angra II by 1992 and Angra III by 1995, it would be necessary to apply 1.66 billion cruzados "as quickly as possible." [Text] [Sao Paulo O ESTADO DE SAO PAULO in Portuguese 9 Sep 86 p 40] 8711/7051

SABOIA ON IPERO INSTALLATION--Brasilia--"The Navy does not produce fuel for its conventional propulsion units and it is not going to produce it for its nuclear propulsion programs. The Ipero facilities will serve only to house a prototype reactor similar to the one that will be used in our atomic submarine." That is how Navy Minister Henrique Saboia reacted to the reports that the Navy had installed a uranium enrichment plant in Sorocaba. "I never made a secret of the Brazilian Navy's intention to build a nuclear submarine," declared the minister. "But that is a long way from what appeared in the press. I will not speak about uranium enrichment because that does not fall within the purview of my ministry." On the other hand, the nuclear submarine would also be a long-range goal. "We are developing everything," he said. "Nobody provides anything in that sector and we are starting from zero in our research. Every time we buy something abroad, they are going to relate it to the nuclear submarine project." [Text] [Rio de Janeiro O GLOBO in Portuguese 6 Sep 86 p 16] 8711/7051

CSO: 5100/2005

BANGLADESH

REPORTAGE ON ACTIVATION OF SAVAR RESEARCH REACTOR

AEC Chairman's Remarks

Dhaka THE NEW NATION in English 15 Sep 86 pp 1, 8

[Text]

Bangladesh entered the nuclear age yesterday with successful switching on at 10-30 a.m. of a three megawatt research reactor at Savar, twelve miles from the capital.

Chairman of the Atomic Energy Commisson Dr Anwar Hossain said this event marked the beginnig of a new era in the country's nuclear plan for peaceful uses.

The TRIGA reactor has been procured from the United States from the country's own resources. Fifty per cent of its installation work was done by the local scientists and engineers.

While the plant will be the basis for preparing the country for future nuclear power programmes and provide opportunities to the scientists and engineers for research work, it will produce radio isotopes used for improvement and quality control in the fields of agriculture, industry and health.

Such research reactor was first installed in the world in 1942 in Chicago and among the neighbouring countries in 1957 in India and in 1965 in Pakistan.

Plan for a nuclear power plant at Rooppur was first conceived in 1964 but it did not make any headway mainly because of political decision.

Work on the research reactor at Savar started when late President Ziaur Rahman gave the go-ahead in 1978.

Bangladesh has already signed nuclear non-proliferation treaty expressing her intention of only peaceful application of atomic energy.

The Chairman of the Atomic Energy Commission assured that the research reactor would not pose any safety problem or health hazard to the workers and the public during normal operation and even in the highly unlikely situation of a mishap. It can be controlled using five safety and control rods which contain neutron absorbers.

The high negative temperature co-efficient of the zirconium hydride fuel makes it an inherently safe reactor, he added.

Dr Hossain further said the safety aspect had been thoroughly examined by a committee consisting of eminent scientists and engineers. Safety aspects would also be thoroughly monitored by experts from the International Atomic Energy Agency of which Bangladesh is a member.

He stressed the need for nuclear power plant for the country to resolve the power crisis which retarded the economic progress.

Dr. Hossain estimated that a htree hundred megawatt nuclear power plant as envisaged for Rooppur would now cost around six hundred million dollars or 1800 crore taka and it would take seven years to complete the project.

Turning to the research reactor, Dr. Hossain noted with satisfaction that the initial criticality was achieved with 50 standard fuel elements including five safety and control rods in fully withdrawn position having a total of 25 kilograms of 19.9 per cent enriched uranium.

The entire cost of the reactor and associated facilities amounting to Tk 18 crore including Tk. 12 crore in foreign exchange was financed by the government from its own resources.

It was procured from the General Atomic Company of the US which also shared the installation work.

Dr Hossain said the reactor would be a source of neutrons and Gamma-rays which had a wide range of applications in the fields of radioisotope production and applied research. It would help in establishing a scientific and technological base in nuclear science and technology in the country. This would be a back-up facility in order to prepare the country for future nuclear power programmes. The country's nuclear scientists and engineers would be trained utilizing the facilities in and around this reactor.

He further said research reactor was a useful tool for production of radioisotopes, especially the short-lived ones. At present radioisotopes were being imported for use in nuclear medical centres for diagnostic and therapeutic purposes. Local demand for all short-lived would be met from this facility. Radioisotopes to be produced from this reactor would also be utilized in agricultural research, in industries and in various other sectors of the economy.

Construction of the reactor building began in in 1981. The high-density shield structure around the reactor tank was constructed in 1984 using locally available ilmenite and magnetite which were processed at the Atomic Energy Commission's Beach sand Pilot Plant at Cox's Bazar, thus saving a substantial amount of foreign exchange. The mechanical and electrical installation works were completed last year.

The final installation and testing of control system started in July last, fuel loading on September 13 and the criticality was achieved yesterday.

Dr Hossain and his colleagues stayed overnight at the site to achieve the goal.

The reactor will, however, be formally commissioned sometime in December next.

Among the scientists and engineers associated with the project and present at the switching on ceremony were Dr. M.A. Mannan, Dr. Mir Mosharraf Hossain, Mr. K.A. Hasnat, Mr. M. Emdad Hossain, Mr. D.G. Aere (of General Atomic Company) and Mr. Moazzem Hossain.

Turning Point for Country

Dhaka THE NEW NATION in English 18 Sep 86 p 5

[Editorial]

[Text] The inauguration of a three-megawatt nuclear research reactor at Savar the other day marks a turning point for the country in that it brings the nation in direct contact with the possibilities offered by nuclear science. The reactor, procured with local resources, is expected to be the basis of all nuclear power programmes in the future. It may be mentioned here that in the aftermath of the plans made regarding the Rooppur nuclear power plant as far back as 1964 and their consequent non-fulfilment, work began on the Savar reactor in 1978 with a view to facilitating scientific research through such means as radio isotopes. Such developments, it is widely felt in the light of the uses to which nuclear energy has been put in other parts of the world, will contribute to the growth of such vital activities as health, agriculture and industry.

The reactor at Savar, set up at a cost of Taka eighteen crore, possesses the ability to produce neutron and gamma rays that have a great deal to contribute in the fields of radioisotope production and applied research. Since the overall purpose of the national nuclear programme is to use it for peaceful purposes, it is only natural that the Savar reactor marks the first step towards providing the nation's scientists with facilities that till now we have had to import. Radio-isotopes, to cite an example, noted for their diagnostic and therapeutic values, are now expected to be produced locally now that the Savar reactor has been established. While the reactor symbolises an important step in technology for us, there is also the vital issue of the safety factor that has to be considered. Indeed, it is only proper, after what one has experienced about Bhopal and Chernobyl, that such questions should be there. The Chairman of the country's Atomic Energy Commission has asserted that the safety factor has been thoroughly assessed and will be examined periodically by experts of the International Atomic Energy Agency.

The Savar nuclear reactor, it is our considered opinion, fulfils a vital technological need for all of us here in Bangladesh. On the one hand, it formally launches us, in however minor a form, into the nuclear age; and, on the other, it opens up a wide range of developmental prospects for the nation. It is our expectation that when the reactor is formally commissioned later this year, we can truly look forward to constructive times. Being a signatory to the nuclear non-proliferation treaty, Bangladesh has made her intentions clear—and those are basically to pursue a nuclear policy geared to peaceful uses. The reactor at Savar, one notes, should exemplify just such an objective of our policy.

/9274
CSO: 5150/0032

INDIA

DEFENSE EXPERTS: U.S. BLIND TO PAKISTAN BREAKING RULES

Bombay THE TIMES OF INDIA in English 17 Sep 86 p 9

[Text] NEW DELHI, September 16 (PTI).

THE U.S. has turned a blind eye to Pakistan's nuclear weapon programme knowing fully well that Islamabad is violating earlier assurances, according to experts of the Institute of Defence Studies and Analysis here.

They said that in mid-1984, the U.S. President, Mr. Ronald Reagan, wrote to Gen. Zia that the U.S. aid would be cut off if Pakistan raised the enrichment level of uranium above five per cent.

This was one of the four conditions imposed on Pakistan for continued aid. The others were non-reprocessing of enriched uranium, non-fabrication of nuclear device and no open test of nuclear weapons.

The experts said there is enough evidence to prove that Pakistan has not only increased its enrichment capability but also raised the level of enrichment to 30 per cent.

Instead of putting pressure on Pakistan to slow down or halt, they said, the Reagan administration has now given a permament waiver by signing an amendment enabling continued U.S. aid to Pakistan regardless of its progress in the nuclear weapons programme.

The experts said Pakistan has no civil need for the uranium enrichment plant which began operating at Kahuta near Islamabad in 1984.

Atomic bombs can be made from plutonium collected during the reprocessing of irradiated uranium from a reactor, or from highly enriched uranium.

Meanwhile, "New Scientist", a leading British science magazine, quoting observers said the change of heart in the U.S. is a tacit recognition that Pakistan now has the capability to build the bomb and that continued restrictions are pointless.

Quoting Mr. Abdul Quader Khan, an eminent Pakistan nuclear physicist, the "New Scientist" said enrichment of uranium is a Herculean task, the most difficult of the whole fuel cycle. Only seven or eight nations in the world have perfected it.

The western world could never imagine that a country like Pakistan could break their monopoly, Mr. Khan had said.

Experts here say that Pakistan so far has no nuclear power programme which requires enriched uranium as fuel. The only power reactor it has at Karachi is run on natural uranium.

Even in the near future, Pakistan atomic energy commission has no project to make use of enriched uranium other than military purposes, the experts added.

/9274
CSO: 5150/0033

INDIA

SPENT FUEL BUNDLES REMOVED FROM KALPAKKAM REACTOR

Madras THE HINDU in English 29 Sep 86 p 1

[Text]

MADRAS, Sept. 28.

Engineers at the Madras Atomic Power Station, Kalpakkam, have made a breakthrough in their efforts to restart the 235 MW Unit II which was shut down six weeks ago after the two spent fuel bundles got stuck while being removed from the reactor.

Mr. M. H. P. Rao, Executive Director, Nuclear Power Board, told THE HINDU today that in a carefully planned remote controlled operation on Saturday night, the engineers managed to retrieve the two radioactive fuel bundles. These were put in a specially fabricated lead cast, sealed and then deposited safely in the spent fuel bay.

The reactor, which was unaffected by the incident, is likely to be started up in a week's time, Mr. Rao said.

The day-long operation had to be done by remote controlled machines, since the area had high radiation and was inaccessible to the staff. Mr. Rao said the task was accomplished smoothly without exposing the workmen to undue radiation.

However, much preparation was required. The lead-shielded cast was designed and fabricated specially for this operation and the entire procedure was rehearsed three times before it was tried out on the site.

First time: It was the first time that nuclear scientists in the country had encountered such a problem. In a reactor such as the one at Kalpakkam, the spent fuel bundles are removed from the reactor by a remote controlled fuelling machine which then pushes them into an enclosed chute that leads to the storage bay, about 80 metres away from the reactor.

This particular pair of fuel bundles imprecisely guided into the chute because of a faulty cable, got jammed and broke on impact.

The job of cleaning up the debris from the broken bundle began today and once this was completed, the reactor would be started Mr. Rao said.

While the repair operation has apparently not caused much expenditure in terms of equipment and material, the long shutdown has upset the nuclear station's output plans. This and the Unit I have had more than a fair share of problems this year. The generator transformers of the Unit I had to be replaced, there was a leak of radioactive heavy water from its reactor and there were failures in the heavy water pumps.

Power output in 1986-87 is expected to fall well short of the targeted 2,200 million units. Authorities hope they will be able to generate about 1,800 million units.

/9274
CSO: 5150/0034

BRIEFS

NUCLEAR SAFETY PROVISIONS--Vienna, 1 Oct--The Atomic Energy Commission Chairman, Dr Raja Ramanna, expressed India's disappointment that the convention on early notification of nuclear accidents, adopted at the special session of the International Atomic Energy Agency, did not cover all kinds of nuclear accidents. The special session also adopted another convention on assistance in the case of a nuclear accident or radiological emergency. The conventions were signed by India on Monday. Dr Ramanna said the convention should have covered accidents from whatever source, civil or military, including accidents from nuclear weapons or nuclear weapons tests, since their results would be equally damaging. Dr Ramanna said, "Nevertheless, we have decided to sign both the conventions in view of the solemn assurance that has been given by the five nuclear weapon States to the effect that they undertake to notify all accidents." "This is in keeping with our policy of according to public declarations of the State policy equal validity with other international commitments," he added. "While ratifying these conventions, it is our intention to indicate our reservations with respect to certain articles of the two conventions," Dr Ramanna said. Elected chairman: The IAEA conference opened on Monday with the election of Dr Raja Ramanna as chairman of the five-day meeting. His name was proposed by Bangladesh and supported by the U.S., Mexico, France, Poland, Indonesia, Tunisia and Japan. In his opening speech, Dr Ramanna said nuclear power would be the determining energy source of developing countries in the future. "Nuclear energy is the greatest value to development in the world," he said. "The accords we reached last week showed a spirit of cooperation that makes us confident for the future." [Text] [Madras THE HINDU in English 2 Oct 86 p 7] /9274

HEAVY WATER LEAK--Jaipur, 1 Oct--The second unit of the Rajasthan Atomic Power Project (RAPP) in Rawat Bhata near Kota had to be closed down on Monday night owing to leakage of heavy water from "the mechanical shield of the reactor's moderator system pump." According to the Chief Superintendent of the project, Mr Nadkarni, the second unit was in "continuous working condition for five months, but the leakage was noticed on Monday at about 9 p.m. and it was decided to close down the unit. A Rajasthan State Electricity Board spokesman in Jaipur, while declining to comment on the closure of the unit, said information about it had been received from Kota. [Text] [Madras THE HINDU in English 2 Oct 86 p 7] /9274

NUCLEAR PLANT GENERATORS--Tiruchi, 26 Sep--The Nuclear Power Board has advised the Bharat Heavy Electricals, Tiruchi, to take up straightaway the design technology for manufacture of steam generators for 500-mw nuclear power plants, Mr R. Ramakrishnan, chief executive, BHEL, told a press conference here on Friday. The nuclear power floor shop here was now busy working on this new design for higher capacity generators for nuclear power stations. The thrust would be on meeting the growing demands for waste heat recovery systems, power equipment for co-generation and combined cycle plants and valves for offshore oil drilling by the Oil and Natural Gas Commission. Apart from manufacture of valves for off-shore and onshore drilling for the ONGC, several facilities would be rigged up at the BHEL here and in a few centres nearer the drilling zones. The first offshore order, worth Rs 235 lakhs, for wellhead and X-mas tree valves had been received from the ONGC against a stiff global competition and would result in a saving of foreign exchange to the tune of the same amount of foreign exchange to the tune of the same amount as these had been imported hitherto. By supplying the special quality valves, the BHEL would also be instrumental in saving foreign exchange to the tune of Rs 125 crores during the Seventh Plan period. Already about Rs 600 lakhs was invested in introduction of modern manufacturing process and new products. It was proposed to spend another Rs 15 crores during the Seventh Plan period for capacity augmentation and modernisation of the valves department. Among the new products likely to be manufactured were quick non-return valves for extraction lines of turbines in power plants and special valves for use in the petroleum industry and cross country gas lines. [Text] [Madras THE HINDU in English 27 Sep 86 p 12]
/9274

CSO: 5150/0035

ISRAEL

BRIEFS

FRENCH REACTOR PURCHASE OFF-- Israel has dropped its plans to buy nuclear reactors from France because of the unprofitability of such an investment in view of the low price of other energy sources. Our economic affairs correspondent has learned that Israel is now looking into the possibility of involving its scientists in research on the latest generation of nuclear plants in various countries. Reacting to this report, a spokesman for the Energy Ministry said that Israel is leaving all its options open. [Text] [Jerusalem Domestic Service in Hebrew 0500 GMT 20 Oct 86 TA] /9274

CSO: 5100/4506

SPOKESMAN ON AFGHANISTAN, INDIAN NUCLEAR CAPABILITY

BK221636 Karachi Domestic Service in Urdu 1500 GMT 22 Oct 86

[Excerpts] The UN General Assembly is due to take up the Afghanistan question for debate on the 4th and 5th of next month. Foreign Minister Sahabzada Yaqub Khan leaves for New York on Monday [27 October] to lead Pakistan's delegation. A Foreign Office spokesman said in Islamabad today that it is Pakistan's hope and effort that the world body will once again endorse the resolution by an overwhelming majority so as to contribute to the building of an atmosphere which will lead to the end of the Soviet occupation of Afghanistan. The spokesman said only with the pull out of the Soviet forces from Afghanistan will there be a restoration of balance in the region.

Referring to the recent Reykjavik summit, the spokesman said it appears that there was no outcome of the talks on Afghanistan. Pakistan believes that the Soviet Union must be reminded on every occasion that a (?normal) situation in Afghanistan will be restored only if it ends the reign of sin and destruction in Afghanistan.

The spokesman said it is no secret that India is capable of producing nuclear weapons. This was stated by the Indian prime minister himself. It is also known to all that India has already produced 40 kg of plutonium. India will benefit remarkably from the manufacture of plutonium in years to come as the reactor in Madras also begins to manufacture plutnium which does not fall under any safety regulation.

The spokesman also said that visits by the naval ships of friendly countries to Pakistan is a normal thing. More than 80 naval ships including those from the United States, France, Britain, and Indonesia, had made friendly visits to Karachi harbor in the past. Referring to the criticism of the Government of India, the spokesman said not only does India provide facilities for visits by foreign ships but it has also provided permanent facilities for Soviet naval ships at Visakhapatnam port.

/6091
CSO: 5100/4707

BRIEFS

KARACHI ATOMIC POWER PRODUCTION--The Karachi atomic power plant has produced more than 338,000 megawatts of electricity during the first 8 months of this year, which is almost a record. [Text] [Karachi Domestic Service in Urdu 0600 GMT 14 Oct 86 BK] /12232

CSO: 5100/4706

SOUTH AFRICA

STATE SPENDING ON NUCLEAR ENERGY CRITICIZED

Johannesburg THE ARGUS in English 11 Sep 86 p 4

[Text] AN overwhelming proportion of State expenditure on energy research is dedicated to nuclear energy which has a limited role in South Africa now and an uncertain role in the future, said Koeberg Alert member Mr John Venn.

Mr Venn was delivering a paper entitled *Nuclear versus Renewables — A Misallocation of Resources?* at the Renewable Energy Potential conference at the University of Cape Town yesterday.

He said scientists had shown that South Africa's "real energy crisis" was in the rural and peri-urban areas where the population was dependent on renewable energy — mainly in the form of wood.

It was also "very clear" that projections of nuclear power made during the oil energy crisis in the 1970s would not be realised.

"It is surprising that South Africa continues to allocate far more funds and effort to nuclear research and development than to other options, including renewable energy research."

R115-MILLION

Mr Venn said the total expenditure of the Atomic Energy Board rose from R8,5-million in 1970 to nearly R115-million in 1983.

After the establishment of the Atomic Energy Corporation in 1982, its budget rose from nearly R348-million in 1984 to more than R775-million for 1987.

About two-thirds of South Africa's population was heavily dependent on fuel wood, Mr Venn said. Current use of fuel wood was inefficient and of serious environmental concern because of the destruction of tree cover.

However, the total expenditure of the non-nuclear National Programme for Energy Research was "very small" — only R3 to R4-million.

/9274
CSO: 5100/5

SOUTH AFRICA

RADIOACTIVITY LEVELS TESTED AT VAALPUTS

Cape Town THE ARGUS in English 18 Sep 86 p 21

[Article by John Yeld]

[Text] EXHAUSTIVE field tests covering a wide range of environmental disciplines are being conducted at the Atomic Energy Corporation's (AEC) Vaalputs radioactive waste disposal site in the Northern Cape.

Dr Danie van As, manager of the AEC's isotopes and radiation department, told the *Radwaste '86* conference in Cape Town last week that an environmental monitoring programme had been established in November 1984 — two years before any radiaoactive waste was due to reach Vaalputs.

The area around the site had been divided into 16 sectors with monitoring points at one, three and 20 km distance, including 16 soil, 16 vegetation and 32 radiation monitoring points. Agricultural produce was also checked.

Evaporation

Because ground water was considered the most important potential pathway for radiation contamination, there were 106 water monitoring points, Dr van As said.

However, only a very small amount of rainfall was available to percolate through the ground level because of the extremely high rate of evaporation.

"We feel fairly confident we will not have any environmental contamination in this case (via ground water)," he said.

Professor Tony Hall, assistant curator of the University of Cape Town's Bolus Herbarium, said botanical research at Vaalputs looked at possible biological channels in plants for bringing radioactive material to the surface.

Likely management problems at the site included the appearance of deep-rooted weed species such as American mesquit whose roots could reach 18 metres — well beyond the two-to-seven metres of the waste burial trenches, Professor Hall said. Attention would have to be given to making the trench caps hard and impenetrable to roots.

Professor Hall said more was now known about plant ecology at Vaalputs than any other part of Bushmanland and he suggested the establishment of a permanent research station for long-term scientific studies be established there.

Professor Jan Nel of the University of Stellenbosch's zoology department said current baseline studies on rodents such as the Karoo rat could help determine any future population changes and abnormalities caused by radiation.

Possible interactions between the radiation source and animals was studied by plotting burrowing activities and measuring the amount of soil brought to the surface by rodents and insects such as harvester termites.

/9274
CSO: 5100/5

SOUTH AFRICA

BRIEFS

IAEA BREAKS OFF NEGOTIATIONS--The International Atomic Energy Agency (IAEA) has broken off negotiations with SA over application of safeguards to the uranium-enrichment plant at Pelindaba. The IAEA says SA recently proposed unacceptable conditions for inclusion in a draft safeguards agreement which had been prepared during earlier discussions. SA has never responded to IAEA calls to submit to full-scope safeguards agreements on all its nuclear plants. [Text] [Johannesburg BUSINESS DAY in English 24 Sep 86 p 1] /9274

CSO: 5100/5

SWEDEN

NUCLEAR FUEL PLANT PLANS UNDERGROUND RESEARCH, STORAGE LAB

Stockholm DAGENS NYHETER in Swedish 30 Sep 86 p 12

[Article by Ingemar Lofgren: "Nuclear Wastes Can Remain in Smaland"; first paragraph is DAGENS NYHETER introduction]

[Text] Svensk Karnbranslehantering AB [Swedish Nuclear Fuel Management Company] (SKB) will build an underground laboratory at Simpevarp, adjacent to Oskarshamn nuclear power plant. The laboratory is intended for research. It is possible, however, that it will later be used as storage for all highly radioactive waste in Sweden.

"If the bedrock at Simpevarp proves to be good, it will naturally be of interest in discussions about a future storage place as other places we have looked at have been," said Managing Director Sten Bjurstrom of SKB to DAGENS NYHETER. "But in principle it is too early to raise that question."

The construction of an underground laboratory at Simpevarp is a part of the research and development program which SKB turned over to the State Nuclear Fuel Authority yesterday. The program, which is the first since the law covering nuclear technology became effective in 1984, describes primarily what SKB plans to do during the next six years at a cost of about 600 million kronor.

The intent of the underground laboratory, which will be completed in 1992 at a cost of 175 million kronor, is that SKB will work further with research on the movement of ground water and the stability of the bedrock, among other things.

Knowledge

"Today we have rather broad knowledge of the bedrock and other factors which are important for final storage of nuclear waste," said Sten Bjurstrom. "But now we are at a stage where we want to summarize the knowledge, and we can do that best in an underground laboratory under real conditions."

The laboratory will be at least 400 meters deep, and during its working life, estimated at 20 years, it will have a permanent staff of 15 people.

According to Bjurstrom there are no mental reservations about the selection of Simpevarp. The laboratory could have been placed anywhere in Sweden where the bedrock consists of granite and gneiss.

"We have thoroughly examined and drilled in eight locations in Sweden. We have concluded that Swedish gneiss and granite are excellent for the storage of nuclear waste. As we will now build an underground laboratory, the bedrock must be reasonably representative of Swedish bedrock--and that is what we have in Simpevarp."

Drilling Completed

The eight locations where SKB has drilled to find a suitable storage site are Kamlunge, Gidea, Svartoberget, Finnsjon, Fjellveden, Krakemala, Klipperos and Starmo. None of these can be excluded as disposal sites for used Swedish nuclear fuel. It remains to be seen whether Simpevarp will be the ninth location.

According to SKB, drilling of the Swedish bedrock has been completed. Now it will be studied and summarized. In 1993 at the latest, two of the locations will be selected and investigated more carefully; not only geologically, but also in terms of population, transportation, etc. Then it will be up to the government to select one of them. That will take place in 1998.

9287
CSO: 5100/2407

TURKEY

BRIEFS

HAZELNUTS AFFECTED BY RADIATION--Hazelnut exporters have accused the government of acting "indifferently" about radiation. The president of the [Hazelnut Exporters'] Association Hakki Uzan said: "Why did they not warn us when Britain returned shipments of sage, anise and cumin 1 and 1/2 months ago because of radiation?" Uzan told UBA the following: "After the nuclear power plant incident [at Chernobyl] all produce containing radioactivity was destroyed in all European countries. The producer was compensated for that. Our government did not even warn the producers. It acted slowly and indifferently. The government is responsible for letting the radiation problem in hazelnuts to reach this stage. To expedite control we are going to import a radiation measuring device for 50,000 deutschemarks. If we lose the export season the Turkish economy would be hurt substantially." According to a report by our Giresun correspondent Mehmet Yuksel, Motherland Party assembly deputy Ahmet Yilmaz said: "Even if the hazelnut crop contains high levels of radiation, we will not let the crop remain in the hands of the producers. If necessary we will destroy it." The price of hazelnuts dropped to 500 Turkish liras per kilogram on the open market. [Text] [Istanbul MILLIYET in Turkish 12 Sep 86 p 4] 9588

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END

JPRS-TND-86-026
3 DECEMBER 1986

Worldwide Report

NUCLEAR DEVELOPMENT
AND
PROLIFERATION

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JPRS-TND-86-026

3 DECEMBER 1986

WORLDWIDE REPORT

NUCLEAR DEVELOPMENT AND PROLIFERATION

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HONG KONG

FINANCIAL SECRETARY SPEAKS IN 15 OCT DAYA BAY DEBATE

Excerpts of Speech

Hong Kong SOUTH CHINA MORNING POST in English 16 Oct 86 p 6

[Excerpts] - I intend to produce for issue to Members a paper which will provide, as far as the Government is able, the information sought in the motion. It will also address many of the specific points that have been made by Members.

On November 9, 1983, when I announced the Government had agreed to the Daya Bay project, I indicated it offered Hongkong an opportunity to demonstrate its desire to co-operate fully with China in its four modernisations program and that it also provided another clear indication of our faith in the future. Overall the project was seen as a positive development which augured well for Hongkong's future.

It was, of course, only after the accident at Chernobyl that the safety of the Daya Bay plant became a matter of great concern to the Hongkong public generally. Nevertheless, even after Chernobyl it is still accepted by many governments that nuclear energy must remain an option.

What Chernobyl did was to put into sharp focus as never before the potential problems of nuclear energy. Hongkong was no exception and with a revived and intensified public debate on Daya Bay, the Secretary for Economic Services visited the United Kingdom and France for on the spot discussions in the wake of the disaster.

One outcome of that visit was that the terms of reference of the Harwell study are to be extended to incorporate any lessons learnt from Chernobyl with particular reference to Hongkong and its circumstances. Moreover, last month Hongkong attended as an observer the International Atomic Energy Agency (IAEA) meeting on safety in Vienna.

At that special ministerial meeting two important conventions on early notification and assistance in the event of a nuclear accident were adopted.

As to the Daya Bay plant itself, we must never lose sight of the fact that this is a power station being built in China. It is, of course, true that a Hongkong company has a minority position in the joint venture. And even though the Hongkong dimension has been important and has allowed us an input in the deliberations concerning the power station, the fact that it is a Chinese project necessarily limits the scope and scale of our involvement.

It must also be remembered that the Chinese have on many occasions made it clear that they intended to proceed with the power station with or without Hongkong's participation. Surely it is better for Hongkong to participate than be left out with no influence whatever over the construction of station and its subsequent operation.

No issue than Daya Bay, other than the agreement on the future of Hongkong, has been discussed so exhaustively in public. A mass of infomation has been given. In addition to debate, questions and statements in this Council, senior Government and Company officials have been involved in numerous press conferences, and briefings for Members of this Council. The Umelco Public Utilities Panel has also gone to great lengths to keep the media and public informed of development and their own discussions with key officials. The issue has been frequently aired at senimars and other public forums, all of which have been given saturation coverage by the media, which itself has been far from reticent in putting forward its own views.

The Government has at all times been fully aware of the deep and genuine concern expressed in Hongkong. It has done everything within its powers to convey this concern to the British Government and, through it, to the Chinese Government. One result has been the significant assurances on safety given by the Chinese authorities to the Legislative Council Delegation during their recent visit. Furthermore, consideration is being given to involving Hongkong people in monitoring the construction and operation of the Daya Bay station.

What are the Hongkong Government's specific responsibilities? They are the same as those of any metropolitan authority where a nuclear power station is build near its border; that is, first, to ensure as far as possible that those involved in building and operating the plant maintain the highest possible safety standards and, second, to devise contingency plans in case of an accident. In addition, there is the question of education of the community. The Government is discharging those responsibilities.

Now to the cost of electricity. Members of the public are, of course, concerned that they should pay no more than a reasonable price. Nevertheless, the future requirements for electricity in a continuously growing economy must be met if our industries are to remain viable and living standards are to improve. In practice, the arrangements that are embodied in the Schemes of Control have produced that result and have stood the test of time. We enjoy an electricity supply at a price that compares favourably with that charged elsewhere in the region. Shareholders have received a fair return that has been sufficient to induce continuing investment.

As to the Daya Bay project, throughout its evaluation and consideration our objective was to ensure that at the very least the cost of electricity generated by that station would be no more expensive than electricity generated in Hongkong by conventional means. Let me restate some of the considerations that were involved.

First, one of the main considerations that we took into account was the potential cost and financing of a new coal-fired station in Hongkong. Large sums of money would have been involved and there might well have been difficulties in obtaining investment of that magnitude without considerable financial strain.

Second, the share of Hongkong Nuclear Investment Company (HKNIC) in the Daya Bay nuclear power station will not constitute part of the CLP group of companies' net fixed assets for the purpose of calculating permitted return under the provisions of the Scheme of Control.

Third, and perhaps most important from the point of view of the consumer, the prior approval of the Government is required both for any financing plans the company may wish to adopt in relation to any major additions to the company's system and the tariffs the company may charge to its consumers.

Let me explain generally the procedures adopted for agreeing the levels of electricity prices charged by CLP.

We will give details in the paper that I shall be issuing on how the purchase of electricity from the Daya bay station will be dealt with in calculating or computing the tariff charged by CLP.

Briefly, nuclear power purchased by CLP will, for Scheme of Control purposes, be treated like any other purchase made by CLP in the process of providing its consumers with electricity. That is, it will be considered in exactly the same way as the purchase of coal, oil, or indeed electricity purchased from the Hongkong Electric Company Limited.

I turn now to the reasons why the nuclear option was chosen. Following a comprehensive joint feasibility study undertaken by CLP and the Guangdong Power Corporation it was concluded that the joint development of a nuclear power station in Guangdong was both technically and financially feasible.

After carefully considering the proposals that had been formulated in respect of the project, I announced that, subject to a satisfactory resolution of the fiscal and commercial terms for the project, the Government supported the participation of Hongkong interests in the joint venture project and reaffirmed that it would not object to CLP purchasing power from the nuclear plant.

The conditional nature of the endorsement given by the Government was deliberate. Arrangements for the purchase of electricity from Daya Bay had not, at that stage, been finalised. In the interest of consumers, the Government conveyed to CLP the view that further discussions should take place on the proposed fiscal and commercial terms.

After a year of intense negotiations, additional benefits for consumers were secured. These included: concessionary tax rates for the project; the introduction of a flexibility provision concerning the purchase of electricity; and, for the larger part of the electricity to be bought, a ceiling on the price that would be paid during the first six years.

It was on the basis of these successful negotiations that the Government, in Jan[illegible] indicated to CLP and HK[illegible] it had no objection to the[illegible] entering into the contractual arrangements that had been agreed for the formation of the Joint Venture Company, and the purchase of electricity from the project.

Given the anxieties felt worldwide as a result of the Chernobyl disaster it was in no way surprising that deep and genuine concern should also be expressed in Hongkong about the safety of the plant at Daya Bay, some 50 km away from Hongkong. The Government fully appreciates the concern and realises the importance of providing information on the safety of the project.

Thus, in early May, immediately after the Chernobyl incident, the Government issued to this Council two information notes with a view to assuring Members that the Chernobyl incident would have no direct effect on Hongkong and also reminding Members of some of the safety considerations involved in the Daya Bay project.

In the debate on July 16, I said the Administration shared the general concern expressed by Legco members, and I indicated the steps we had been taking to urge all those involved in the project to take fully into account the concerns being expressed in Hongkong over safety matters. The fact-finding missions by Members were, of course, part of the process and the information obtained did much to reassure those who studied the report.

So now I shall deal with the report by the fact-finding delegations on their visits to the United States, Europe and Japan.

The report contains 50 observations, seven of which are directed at the Hongkong Government for consideration. These observations, which are all safety related, cover contingency planning, the need for closer cross boundary co-operation, a greater effort in providing information to the public, the need to set up an independent committee to advise on matters related to nuclear energy, and a suggestion that Hongkong should consider membership of the International Atomic Energy Agency (IAEA). The Government appreciates the significance of these seven observations and will seek to implement all of them in so far as it is practicable. Sir, I shall now give, in detail, the Government's comments on these seven observations.

The Government agrees with the first three observations which relate to contingency planning. The first observation is that a contingency plan should be drawn up for those areas which lie within 50 miles of the Daya Bay plant for protective measures in the event of radiological releases affecting Hongkong. (Ref 5.3.2.(1) of the report).

Although a number of contingency plans and a well-tried civil control system exist to co-ordinate all emergency services during accidents and natural disasters, the Government nevertheless accepts that, as a matter of prudence, a detailed contingency plan should be prepared to deal with the remote possibility of an accident at Daya Bay resulting in risks to Hongkong.

With this in mind, the Government, in mid-1985, engaged the United Kingdom Atomic Energy Authority (UKAEA) at Harwell to provide expert advice. Harwell's report providing guidance for the preparation of a detailed contingency plan is expected before the end of this year. Using the information provided in this report, and suitably adapting the well founded principles on which existing contingency plans have been based, an appropriate contingency plan to meet Hongkong's circumstances will be prepared. Once completed, it will be added to the range of contingency plans already held by the Government and will be regularly reviewed and kept up-to-date.

The second observation proposes that protective measures should be planned against the contamination of water supply, vegetables and other food and dairy products (Ref 5.3.2.(2) of the Report).

The Government already has certain contingency plans to deal with the disruption of food and water supplies, but these require adaptation in relation to the Daya Bay project. Accordingly, UKAEA will provide specialised advice as part of its consultancy on the contamination of water and food chains. This will enable detailed plans to be prepared which will augment or replace as necessary existing contingency plans.

The third observation is that a Government committee should be set up for the preparation of contingency plans (Ref 5.3.2.(3) of the Report). An existing inter-departmental working group, set up to co-ordinate strategy on the environmental issues arising from the Daya Bay project, will accordingly be specifically tasked to consider the preparation of detailed contingency plans. The working group, which is chaired by the Secretary for Economic Services, comprises representatives from Security Branch, the Electrical and Mechanical Services Department, the Medical and Health Department, the Royal Observatory and the Environmental Protection Department. Other branches and departments are consulted when the need arises.

The fourth observation is that a cross boundary agreement should be made with China to enable Hongkong to monitor radioactivity at close range, to exchange information and to co-ordinate contingency planning for Hongkong (Ref 5.3.3.(1) of the Report). The Government fully supports the suggestion that close co-operation between the authorities on each side of the border should be established to ensure contingency plans are suitably co-ordinated and to ensure Hongkong is provided with immediate notification of any accident at the power station. I might add that close and cordial contacts have already been made with Chinese officials of the Guangdong Nuclear Power Joint Venture Company (GNPJVC).

During the past two years the Royal Observatory and GNPJVC have been jointly involved in recording weather data at the Daya Bay site. Useful discussions have also taken place on radiation monitoring and the preparation of environmental impact and safety studies. These contacts will, of course, be further developed whenever necessary.

Once the nuclear power station has become operational a direct link between it and CLP's distribution control centre at Tai Po will be established. Furthermore, staff appointed by the Hongkong partner, HKNIC, will be involved in the operations of the station. Thus it is difficult to imagine any serious incident occurring at the power plant without Hongkong becoming immediately aware of it through these contacts.

The fifth observation is that the Hongkong Government should strengthen its public information program to make information about nuclear energy and the effects of radiation available (Ref 5.3.4.(1) of the Report). A program of public education activities is currently under preparaton and a start to its implementation will be made in the near future in liaison with the programs to be launched by HKNIC.

Meanwhile, it has been agreed with the Education Department that teaching the concept of nuclear energy should also be strengthened in the school curriculum. Two teaching/learning packages will be produced and made available to secondary schools for use in the academic year of 1986/87. These could be used in support of the existing Integrated Science curriculum (at junior secondary level) and the Physics curriculum (at senior secondary level). They could also be integrated as part of the general education programs for secondary school students. In addition, two educational television programs will be produced and made available to the schools.

The sixth observation is that the Hongkong Government should set up an independent advisory committee to advise on matters related to nuclear energy (ref 5.3.5.(1) of the Report). The Government accepts that an independent advisory committee, dealing with certain aspects of nuclear energy including the formulation of proposals appropriate to Hongkong's needs and circumstances, might well be of value.

The Government will, therefore, give further careful consideration to setting up such a committee. However, in the references appended to this observation, the report refers to the independent advisory role of the Nuclear Regulatory Commission in the United States and the roles of the Atomic Energy Commission and Nuclear Safety Commission in Japan. Having regard to the fact that these bodies are essentially concerned with the safe construction and proper operation of commercial nuclear power stations within their respective national boundaries, it would not be appropriate for Hongkong to contemplate establishing an advisory body with responsibilities similar to those of the three commissions mentioned.

The seventh observation concerns the International Atomic Energy Agency (IAEA). It is suggested that the Hongkong Government should seek membership of the IAEA in order to establish an international link with nuclear safety agencies and to obtain information and advice on nuclear safety (Rdf 5.3.6.(1) of the Report).

As the IAEA statute limits membership to states, it appears unlikely that Hongkong is eligible for full membership. Nevertheless, both the United Kingdom and China are members. Close contacts with IAEA have been established through the British Government. Indeed an agreement was entered into between the British Government and the IAEA on 4 February 1983 with the express purpose of providing technical assistance to the British Government on behalf of Hongkong.

Appropriate information and technical assistance from IAEA will continue to be made available to Hongkong through this channel. In addition, it is envisaged that from time to time the Hongkong Government will send observers to appropriate IAEA meetings, as part of a UK Government delegation. It was in this capacity that a Principal Assistant Secretary from the Economic Services Branch recently attended the special session of the IAEA General Conference in Vienna, which was convened to discuss general questions of nuclear safety.

Some members have continued to suggest that the Government should withdraw from this project or urge CLP to withdraw. For the reasons I stated on July 16 when we last debated this matter, I believe that any such action would be extremely damaging to the credibility not only of the Government but perhaps even more important to the credibility of Hongkong itself.

If our word cannot be relied upon in future, what chance do we stand in any commercial arrangements into which we might enter with other parties?

What would be the value of a Government guarantee that can be withdrawn? What is the significance of an approval that can be cancelled at the will of the Government? Where is the stability?

I have stressed that approval of this project was given after the most careful consideration and nothing that has been said could possibly justify the withdrawal of that commitment. I do not for one moment believe that the majority of our community would wish to see Hongkong's international reputation placed in jeopardy by such a breach of faith.

I know that there is a wide range of opinion regarding this matter. Some are against all nuclear power and will not be convinced by any argument to the contrary.

Apart from that group, I hope that all who have listened to or read this speech will be ready to look at the issues on their merits and accept that the Government has done all in its power to ensure that this project is as safe as it can possibly be made and that our participation is justified on economic grounds.

Finally, we believe that the arrangements that have been concluded do indeed sufficiently safeguard the long-term interests of the people of Hongkong. We believe that the information that I have given this afternoon coupled with what I said in the earlier debate, both to be augmented by the paper that I shall be issuing, will so demonstrate.

More Assurance Needed

Hong Kong SOUTH CHINA MORNING POST in English 16 Oct 86 p 20

[Editorial: "Verification Needed on Daya Bay Promises"]

[Text] THE great debate on Daya Bay is over, and what has been achieved? Despite the cynics, a lot, but not as much as the Government would like us to believe. More assurances have been given, certain safety steps are to be taken, more facts are to be presented. The Daya Bay nuclear power station is to be built, and the controversy means it will probably be safer than originally proposed, and public opinion in Hongkong has shown it is not to be taken lightly. These are important developments. On the other hand, there is still a long way to go to put into place the verification machinery needed to ensure that the promises on safety of construction and operation are properly carried out.

Of the many speeches delivered in the Legislative Council last night, the most important was the 25-page address by the Financial Secretary, Mr Piers Jacobs. Apart from reiterations of previous assurances about safety measures, and a promise of more detailed information, it restated the Government's position, refused to divulge sensitive commercial information, accepted a number of the "observations" made by Legislative Councillors after their overseas trip, and fudged on some others.

As we have stated before, the building of Daya Bay has been a foregone conclusion. But it would be wrong to assume the debate has been a waste of time. On the contrary, it achieved some progress over safety matters. But the controversy has always had more to it than public concern over safety. It has had political overtones, reflecting a degree of frustration among the general public about a system which in the final analysis was not accountable for the decisions it makes. The Government's failure to realise this contributed to the length and fierceness of the controversy after Chernobyl gave nuclear power a bad name. The Government took an inordinate time to realise that assurances mean little without verification, or to satisfy demands for further information.

Although Mr Jacobs was surprisingly light on real facts in his speech, he promised to present – hopefully soon – much of the information sought as to safety and electricity tariffs. This will not breach commercial sensitivity, but as long as the reasons why some information has been withheld are explained, it should satisfy those seeking further information on the financial aspects.

Mr Jacobs made the Government's position crystal clear on demands by some critics for it to withdraw from the project. The answer is no. The Government finds no reason that could possibly justify withdrawal. It points out that if it did withdraw, the action would be extremely damaging to the credibility of the Government and of Hongkong itself. We agree. If our word cannot be relied upon, if Government guarantees and approval can be withdrawn at will, where does this leave Hongkong? And the plant will be built regardless.

Which brings us to an important point on which the Government was less than totally forthcoming. The question of confidence, which Mr Jacobs properly stressed as a reason for commitment to Daya Bay, applies as strongly to the promises of safety of construction, operation and monitoring which we have been given. It is essential the public has total confidence that these promises will be properly kept and implemented. Simply saying it is not enough.

The Government has accepted some recommendations of the Legco fact-finding delegations. A contingency plan is to be prepared, including protective measures against the contamination of water and food, a government working group is to prepare plans and coordinate strategy, and increased attention will be given to public education.

So far so good, but Mr Jacobs fudged on several other important recommendations. The Government's reaction to the request for a cross boundary agreement with China for Hongkong to monitor radioactivity at close range, to exchange information and to coordinate contingency planning boils down to "close co-operation" and "useful discussions." A direct link will be established between Daya Bay and China Light and Power, but there is no certainty Hongkong will be able to monitor radioactivity at close range as requested. The Government was asked to establish an independent advisory committee to advise on nuclear matters: this will receive "further careful consideration." One would have thought there had been enough time already to consider this, but Mr Jacobs says a body with responsibilities similar to the Nuclear Regulatory Commission in the US, or to the Atomic Energy Commission and Nuclear Safety Commission in Japan (which he says were essentially concerned with the safe construction and proper operation of commercial nuclear power stations within their respective national boundaries) was not appropriate. In other words, there is still no certainty that the independent means with which to verify the promises can be set up. China has yet to commit itself to involving Hongkong people in monitoring the construction and operation of the Daya Bay station, though Mr Jacobs said this was under consideration.

This newspaper has repeatedly stressed that this is the natural solution to the legitimate concerns of the people of Hongkong. If Hongkong demonstrates its good faith by adhering to the agreement, China can do no less than invite local participation in the monitoring of the many safety promises it has made. As the Government itself has stressed, confidence and stability is at stake.

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CSO: 5150/0043

HONG KONG

GOVERNMENT SAID TO SUPPRESS NEGATIVE VIEWS OF IAEA

Hong Kong SOUTH CHINA MORNING POST in English 14 Oct 86 p 4

[Article by Albert Chan]

[Text] THE Hongkong Government has been accused of deliberately suppressing "negative views" expressed on nuclear energy at last month's International Atomic Energy Agency (IAEA) conference in Vienna.

Leading local anti-nuclear campaigner Miss Trini Leung said there had been a campaign to withhold information, even though the Government had sent an observer to the conference.

To back her argument she released the text of the opening address at the conference, by Austrian Foreign Minister Mr Peter Jankowitsch, which attacked the use of nuclear energy.

Mr Jankowitsch told the conference, which was attended by top energy officials from the five big nuclear powers – United States, Soviet Union, China, France and Britain – as well as other Western nations, that the Chernobyl accident had proved that nuclear energy was unsafe.

"Chernobyl offers the world several urgent lessons. The first one is that nuclear energy is unsafe in its present operations," said Mr Jankowitsch.

Important

"The Chernobyl accident has not been an isolated accident as it is sometimes portrayed. Rather, it is the worst in a series of nuclear accidents," he added.

The conference marked an important development in nuclear energy development as all member countries signed an unprecedented agreement promising earlier notification in case of an accident and mutual support to remedy such accidents.

Although the Hongkong Government is not a member of the IAEA, it sent Mrs Emmeline Mok, Principal Assistant Secretary (Economic Services Branch), to Vienna as an observer due to concern in the territory over the Daya Bay issue.

Miss Leung said the Government should report fully to the public on arguments for and against nuclear energy expressed at the IAEA conference instead of stressing only one side of the issue.

Miss Leung reported on her participation at the Anti-Atom International Conference, held as a protest in Vienna at the same time as the IAEA conference.

The anti-nuclear conference was attended by environmentalist groups and experts from around the world, notably Greenpeace and Friends of the Earth.

According to Miss Leung, Hongkong's fight against construction of the controversial Daya Bay nuclear project had drawn support from world environmental groups.

A lot of the groups taking part in the conference had agreed to write to the relevant governments – the Chinese, British, French and Hongkong as well as equipment suppliers such as Framatome of France and GEC of Britain – to air their views and add pressure, said Miss Leung.

"The collection of one million signatures in Hongkong over the Daya Bay plant is unprecedented, other anti-nuclear groups told us," said Miss Leung yesterday.

"Some campaigners told us we have probably been staging the most successful anti-nuclear movement in the world."

She said in West Germany, which has a population of more than 60 million, the Government was obliged to call a referendum on an issue if one million signatures are collected.

Miss Leung has invited experts from various countries to explain the disadvantages of nuclear energy.

The first one will be a Japanese nuclear scientist, Dr Ichigawa, who will arrive in Hongkong on October 31 to hold a seminar.

Meanwhile the chief organiser of Hongkong's anti-nuclear movement, Mr Fung Chi-wood, said planned protests against the Queen's visit to Hongkong next week were cancelled because the Queen was not "the one to make decisions".

"She is only a symbol and we feel there will not be much point in protesting," he said.

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CSO: 5150/0044

HONG KONG

DAYA BAY FACTFINDING REPORT CRITICIZED

Hong Kong HONGKONG STANDARD in English 6 Oct 86 p 1

[Article by Jessie Yim]

[Text] **A RESTRICTED Umelco "brief" for the Legislative Council delegation that went to Beijing last month shows there was widespread public discontent with the council's nuclear power fact-finding report.**

The fact-finding report was accepted by both Beijing and by many councillors, despite the severe denunciations the report received from the public.

The Umelco brief, a copy of which has been obtained by *The Standard*, contains letters and comments directed to the Legco fact-finding delegations that visited nuclear installations in America, Europe, and Japan.

It was these two delegations that prepared the report taken to Beijing.

Some of these comments, in rather emotional tones, denounced the report as irresponsible and ignored the worries of the public. They indicated the two fact-finding delegations had done a disservice to the public.

Veteran Executive Council and Legislative Council members, Miss Maria Tam and Mr Allen Lee, who led the fact-finding delegations, were jointly denounced in one letter, and Miss Tam was singled out for personal criticism in another.

The fact-finding report taken to Beijing by the 11 member Legco delegation contained 30 "observations" intended as major points for discussion concerning safety measures of the Daya Bay nuclear plant.

More than 8,000 copies of the report were distributed in Hongkong first. A total of 31 representations — letters, comments and other forms of reaction — were received by the Umelco Office before September 16, less than 20 days after the report was released.

Apart from reactions from political groups and district board members, nearly half of those sent in were written by individuals or resident groups.

Of all the representations, roughly two-thirds contained adverse comment. Many of them contained detailed arguments.

One was written by the Institution of Fire Engineers, a professional group including the Government's fire engineering experts.

The letter said the report "lacks consideration on certain aspects such as pre-planning on fire-fighting operation, training to on-site staff and liaison with local fire authorities."

the Legco group she leads are "irresponsible and therefore will not be trusted any more."

The letter expressed extreme disappointment with the report, saying that the fact-finding delegations were over-presumptive that China would build the Daya Bay plant regardless of opposition.

The institution is an organisation dedicated to promote and improve "the science and practice of fire extinction, prevention and engineering."

However it also noted that "the importance of safety and emergency planning in the operation of generation plants has been recognised."

As for the reactions supporting the report, only three contained details illustrating the reasons.

Of the three, two were written by the Hongkong Civic Association and the pro-China Hongkong Federation of Trade Unions.

On the opposition, three political groups submitted representations, namely the Joint Conference for the Shelving of the Daya Bay Nuclear Plant, the Hong Kong Affairs Society and the organisation, Meeting Point. The Tsuen Wan District Board was the only DB to submit a position paper.

In a highly emotional letter from what claimed to be a group of technicians, Miss Maria Tam and Mr Allen Lee were condemned for ignoring the concerns of the public. The letter said both of them "were once our idols, especially when Hongkong was in a crisis over the future, but when the report was released, all were disillusioned."

Signatories of another said they felt Miss Tam and

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HONG KONG

TEAM TO DISCUSS DAYA BAY WITH BEIJING RELEASES REPORT

Hong Kong SOUTH CHINA MORNING POST in English 4 Oct 86 p 3

[Article by Matthew Leung]

[Text]

BEIJING has made no guarantee that Hongkong people will have cheaper electricity after the six-year agreed price period of the future Daya Bay nuclear plant.

It has also hinted that an independent advisory body for the plant with Hongkong participation would have no executive power.

These observations were contained in a report released yesterday on the visit of Legislative Councillors to Beijing last month.

Eleven Legco members went to the Chinese capital for talks with Chinese officials and also visited various nuclear research institutes.

Councillors noted in their 37-page report that the Chinese Government was of the view that once the Daya Bay contracts were signed, there should not be promises made outside the terms of the contracts.

The Guangdong Nuclear Power Joint Venture Company (GNPJVC) had to discharge its contractual obligations.

China has entered into a guaranteed price agreement for Hongkong consumers over the first six years.

It is then expected that Hongkong's policy for public utility charges — operational costs plus a reasonable profit margin — will be adopted.

As to the price in 13 years' time (seven years of construction and six years of a guaranteed price period), it would not be possible to make an accurate estimate, councillors were told.

However, the Chinese authorities believed that nuclear power should be cheaper than coal-fired power after the first six years of operation.

Chinese Vice Premier Li Peng also gave his support to the establishment of an independent advisory body with Hongkong participation.

Mr Li said it would advise on the safety and management aspects of the Daya Bay plant but it would be a body without executive power.

To ensure the long-term participation of the Hongkong Nuclear Investment Company in management of the plant, the post of plant manager shall be nominated by the HKNIC and appointed by the GNPJVC in the first five years after its commissioning.

In the second five years, the deputy plant manager will be nominated by the HKNIC and appointed by the GNPJVC.

Future arrangements will be negotiated and agreed to by the two sides while the Chinese side guarantees that management personnel will comprise staff from the two companies.

Chinese officials said the task of allaying the worries and fears of the public would require long term effort but nuclear power generation was a science and would stand the test of time.

The GNPJVC will set up a public relations section to draw up a publicity campaign about nuclear energy.

It will also provide a brief report to the public on the progress of the construction project on a quarterly basis.

The Chinese authorities indicated that an emergency response facilities centre would be set up before the plant came into operation.

But since there would only be two full scale nuclear plants in China in the near future (the other will be in Qinshan), they would have to consider where and when to set up a national incident response headquarters.

But China said there would certainly be development in this direction after the two nuclear plants came into operation.

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HONG KONG

DAYA BAY OUTSIDE AREA OF SEISMIC RISK

Hong Kong SOUTH CHINA MORNING POST in English 7 Oct 86 p 3

[Text] THE Daya Nay nuclear power plant site is well outside the area of seismic risk, a visiting Chinese geologist said last night.

Mr Chen Tingguang, senior engineer of the Institute of Geological Science of Guangdong Province, said the area was carefully chosen as a nuclear power station site.

Speaking at a seminar organised by the Geological Society of Hongkong at Hongkong Polytechnic, Mr Chen stressed that the Dakeng area of Daya Bay (where the plant will be built) was not an area of the Earth's crust where medium to strong earthquakes were likely.

It was really an "island of safety", he said.

Mr Chen had taken part in investigations over the last few years in Guangdong for a suitable site for the nuclear plant.

He said several dozen sites in the province had been considered since 1978.

Through intensive data collection, analysis and on-site reconnaissance, Dapeng peninsula was chosen as the key district for detailed site studies.

He said investigation showed that Dakeng district on the eastern flank of Dapeng peninsula was the most suitable site for the nuclear plant.

Summarising, he said the crust in this area was about 27 to 30 km thick and was divisible into upper and lower layers.

Dr M.J. Atherton, senior lecturer in Geology at the Hongkong Polytechnic, said some nuclear plants in Taiwan, Japan and California were built in areas where the danger of earthquakes was higher than at Daya Bay.

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CSO: 5150/0040

HONG KONG

FISHERMAN WARNS OF EFFECTS OF DAYA BAY ON MARINE LIFE

Hong Kong SOUTH CHINA MORNING POST in English 14 Oct 86 p 4

[Text] BEIJING was urged yesterday to pay special attention to the likely effects of the Daya Bay nuclear plant on marine life and the knock-on effect on the livelihood of fishermen.

The call came from Mr Philip Lai, chairman of the Joint Association of Hongkong Fishermen, who recently returned from Japan where he discussed the problem with academics and fishermen.

Mr Lai visited the Tokyo University of Fisheries and the Ikata nuclear plant in Shikoku and talked to fishermen there.

He said Japanese fishermen complained that fish died in waters near nuclear plants and warned that the fishing grounds in the South China Sea might be polluted when the plant comes into operation.

Also, fewer fish would come to the area.

This would result in loss of business for the 100,000 Hongkong fishermen who are supplying 95 per cent of the local fish market, he said.

They would be hit hard and the price of fish would shoot up drastically, he warned.

He also said there was a large number of fishermen in Guangdong province.

The Chinese Government should work out ways to compensate affected fishermen and fish farmers.

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CSO: 5150/0044

HONG KONG

BUSINESSMAN TELLS SAVINGS TO BE ACHIEVED BY DAYA BAY

Hong Kong SOUTH CHINA MORNING POST in English 13 Oct 86 p 3

[Text] AN ESTIMATED saving of$30 billion will be achieved in 26 years after the commissioning of the Daya Bay nuclear power plant, the chairman and a director of the Hongkong partner of the joint venture company told the China News Service.

Mr Stephen Poon, a director of the Hongkong Nuclear Investment Company (HKNIC), told CNS the comparison between nuclear-generated and conventional coal-fired power was based on the difference in terms of costs, fuel price, interest rate, inflation rate, durability of the generating equipment as well as operation and maintenance costs.

Mr Poon said the calculations and analysis were verified by an overseas consultant firm. The analysis was done by China Light and Power Company before the Government approved its participation in the $27 billion project.

China Light has a 25 per cent stake in the controversial project for which contracts for the construction, provision of loans from bankers and supply of equipment were recently signed and endorsed by the Chinese State Council.

In a meeting with a group of anti-nuclear activists in August, Mr William Stones, chairman of HKNIC, said buying electricity from Daya Bay instead of a coal-fired plant in Hongkong would produce savings of $33 billion during the first 20 years of operation.

CNS said the question of how China Light arrived at the saving had caused concern to the people in Hongkong, who wanted to know the methodology in calculations.

Mr Stones told CNS that customers and shareholders of China Light would benefit directly in the construction of the Daya Bay plant through the participation of HKNIC in which China Light had a share.

He said China Light's investment in the Daya Bay project did not come under the Government's scheme of control so the amount of investment in Daya Bay would not be calculated in the assets of China Light shareholders.

Mr Stones pointed out that China Light's plan was to secure a long-term supply of electricity to cope with the demand in the early 1990s. He said by 1993 – especially after the commissioning of the Daya Bay plant – supply of electricity would be sufficient to cope with the need in the mid-1990s.

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HONG KONG

QUESTIONS OVER ECONOMICS OF DAYA BAY NOTED

Hong Kong SUNDAY STANDARD in English 12 Oct 86 p 5

[Excerpt]

The economics of the power station have been somewhat overlooked in the fear of a Chernobyl-type disaster.

Though it can be argued that the power station has very little to do with the economics of electricity generation — it was essentially a scheme to give China an economic interest in the future of Hongkong — it is on economic grounds that the project is being justified.

One point which Legco members and the public have missed is a hole in the six-year guarantee that the price of electricity sold to Hongkong will not be greater than that from conventional stations.

The fine print tells another story. Hongkong will buy 75 percent of the total output of 1,800 megawatts, but only two-thirds of that will carry the six-year guarantee.

This is spelt out in the power take-off agreement. The China partner in the GNJVC, Guangdong Nuclear Investment Company, takes 75 percent of the total output of which 30 percent is used locally and 45 percent sold to Hongkong. It is this share which carries the guarantee.

The 25 percent of total output taken off by HKNIC is "sold" to its parent CLP for distribution here. No price is guaranteed.

This even prompted Mr Allen Lee to take up the economics of Daya Bay, after being in the forefront of those who damned opposition to the power station as alarmist.

What continues to concern councillors is the secrecy maintained over the economics of the project.

CLP's general manager William Stones claims the cumulative savings will be $33 billion compared to a conventional power station built in Hongkong. But nothing is offered to substantiate this.

Some councillors hope to rely on the Scheme of Control — the arrangement under which the power utilities' profits are limited to a percentage return on investment.

This is a vain hope. The scheme only applies to investment in Hongkong and does not extend to purchases of power from beyond the border.

CLP's Steven Poon said that "technically speaking" the scheme was a dead letter as far as HKNIC and Daya Bay went.

Dr Richard Lai told the *Sunday Standard* that if this was so, he might push for a complete review.

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BRIEFS

DAYA BAY OPINION SURVEY--The public is still worried about the safety aspects of the Daya Bay plant, according to a survey. Of the 1,141 respondents who took a stand on the issue, 23 percent said the station should not be built, while 39 percent wanted to have the project postponed until more data on its safety measures were available. Another 35 percent said the authorities should adhere to their schedule. Less than 35 respondents believed that the project should go ahead as planned and there was no need for further safety information. The poll was conducted by the Marketing Decision Research Company during September 1 and 20. During the survey period, two Legislative Council fact-finding delegations went abroad to study nuclear plants in Japan, Europe and the US. "But the poll results show no change in public attitude during September," said Mr. David Bottomley, the director of the survey. [Text] [Hong Kong HONGKONG STANDARD in English 8 Oct 86 p 2] /13104

DAYA BAY FORMALITIES--The Guangdong Nuclear Power Joint Venture Company yesterday issued authorisation documents to the four main suppliers involved in the Daya Bay nuclear plant, following formal approval of the contracts by the Chinese Government. According to a press release issued by the company, the Ministry of Foreign Economic Relations and Trade has approved the four main contracts signed on September 23 in Beijing. These are for the supply of a nuclear island, fuel assemblies, a conventional island and project services, as well as related loan agreements. To make the contracts effective yesterday, the joint venture company also issued authorisations to proceed to the foreign contractors. These "represent a new phase for the Guangdong nuclear power station which will be constructed in accordance with the quality, schedule and budget of the various contracts", the company said. [Text] [Hong Kong SOUTH CHINA MORNING POST in English 8 Oct 86 p 2] /13104

DAYA BAY 'WATCHDOG' COMMITTEE--The Legislative Council is to set up a watchdog committee to monitor the Daya Bay nuclear project. This follows the dissolution yesterday of its fact-finding delegations to Europe, the US, Japan and China. The group will monitor progress on the plant and discuss the future electricity tariff with the relevant authorities, including China Light and Power Co. Speaking after a Legislative Council in-house meeting yesterday, Professor Poon Chung-kwong said councillors were unamimous about forming the group. At least 19 members will speak on the Daya Bay debate on October 15, which will be moved by the Senior Unofficial, Miss Lydia Dunn. Members also agreed Legco should hold monthly adjournment debates on public issues. On October 19, they will debate public housing rental policies; services for the elderly on November 12; and education on December 10. [Text] [Hong Kong SOUTH CHINA MORNING POST in English 4 Oct 86 p 3] /13104

CUSTOMS RADIATION CHECK--The Municipal Services Branch is keeping a watch on food importeed from Europe, checking on radiation levels in the wake of the Chernobyl disaster. Hygiene adviser Dr Ronald Perry said safety standards being used in Hongkong were those set down by the European Economic Community and they were higher than the ones being used by some other countries in the region. Before the Chernobyl incident, said Dr Perry, only occasional checks had been made on the radiation levels of imported foodstuffs but since the disaster they had been stepped up more than a hundredfold. Physicists in Hongkong even checked foodstuffs that were accompanied by health certificates issued by their country of origin. Dr Perry said he was not satisfied unless scientists in Hongkong were content that the imports did not contain dangerous radiation levels. Only "very insignificant" levels of radiation had been found in the imported foodstuffs so far. But Dr Perry stressed that when levels of radiation were found that came even close to the limits set down the imports were set aside and not allowed into the territory for consumption until scientists were satisfied they presented no risk. Products most susceptible to radiation were those derived from the soil which included all animal and vegetable products, said the doctor. Special care was taken with products for consumption by infants and a watch was kept on imported dried milk and other dairy produce. [Text] [Hong Kong SOUTH CHINA MORNING POST in English 4 Oct 86 p 3] /13104

CONVENTIONAL POWER URGED--The Daya Bay nuclear project will be about 40 percent more costly than conventional options of power generation, an Eastern District Board member has estimated. Mr. Shek Kwei-chun yesterday urged the Chinese authorities to consider turning the Daya Bay nuclear power station into an ordinary coal-fired one. "Based on the limited data available, my projection is that the Daya Bay plant will be far more costly to run than a coal-fired plan in the first 20 years of operation," he said. According to Mr. Shek, disposal of nuclear wastes, interest rates charged on the project and the rate of depreciation of the nucler facilities were all undesirable factors in the HK$ 27 billion investment. He said his demand for shelving the nuclear plant was reinforced by the findings of a recent study of residents of 15 districts. About 78 percent of the 3,700 respondents to the poll said they wanted the Daya Bayt plant changed into a coal-fired station. [Text] [Hong Kong SUNDAY STANDARD in English 5 Oct 86 p 3] /13104

CSO: 5150/0041

GROUP TO MONITOR RADIATION AROUND U.S. BASES IN JAPAN

OW240303 Tokyo KYODO in English 0245 GMT 25 Oct 86

[Text] Tokyo, Oct. 24 KYODO -- A group of engineers has developed a small, lightweight, low-cost geiger counter which accurately gauges radiation levels and emits a warning if gamma rays in the air exceed a dangerous level.

The machine is the brainchild of Tau Engineering Co. in Yokohama, a firm set up by former trade union members of Toshiba-Ampex Corp., a Japan-U.S. high-technology joint venture.

A citizens group, the "Kyogaku-sha" in Midori ward, Yokohama, plans to place the instruments near nuclear power stations, radioactive material dumping sites and U.S. military bases in Japan to form a nationwide radiation alert network at some 1,000 locations.

It is suspected that nuclear weapons may have been deployed at U.S. bases in Japan although goverment policy bans the production, possession and introduction of such arms.

The group's spokesman, Tetsuo Iesaka, said the Chernobyl nuclear power station accident in the Soviet Union in April prompted group members to produce a readily available radiation counter. Priced at 80,000 yen per unit, the instrument, dubbed the radiation disaster alert network (R-DAN) counter, is much cheaper and easier to handle than conventional geiger counters, Iesaka said. Prof. Yuko Fujita at Keio University, one of users of the 400-gram instrument said, "It's reliable 100 percent."

The new geiger counter is on display at a Japanese industrial fair now under way in Moscow, and Japanese trading companies are interested in exporting the product to Europe, Iesaka added. The group has already received orders for more than 30 R-DAN counters, according to the spokesman.

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CANADA

CANADIAN PEACE MEET TAKES UP NUCLEAR, ARMS CONTROL ISSUES

8 November Meeting

Toronto THE SUNDAY STAR in English 9 Nov 86 pp A1, A15

[Article by Gordon Barthos]

[Text]

EDMONTON — Canada's peace movement must launch a crusade to "get nuclear weapons and nuclear-related junk" out of the country, Toronto peace activist Bob Penner told 5,000 people here yesterday.

"This country and our leaders are keeping quiet (about Canada's tie-ins with the U.S. nuclear arsenal) at the very moment they should be shouting," Penner said to enthusiastic applause.

"They're dabbling when they should be leading. They're studying when they should be acting and they're acquiescing when they should be rebelling."

Penner called on Ottawa to stop allowing the testing of U.S. cruise missiles over Canada immediately.

He also urged Ottawa to "take a risk" and publicly support Soviet proposals in Geneva to cut ballistic missiles by between 30 and 50 per cent, to shore up existing arms control treaties, and to get U.S. support for a moratorium on nuclear tests.

Penner is co-ordinator of the Canadian Peace Alliance, a grouping of 300 organizations. He was the most warmly received speaker yesterday at the *True North Strong and Free?* conference on Canadian sovereignty and defence policy.

Conference organizer Mel Hurtig, chairman of the Council of Canadians, was delighted by the turnout.

People had to brave brave snow, -18 C (0 F) temperatures and frigid winds to attend the conference, held at the University of Alberta's "Butterdome" sports complex.

The huge turnout will show Ottawa politicians just how much public interest there is in ending the arms race and in seeing Canada develop a more independent stance on defence issues, Hurtig told reporters yesterday.

That sentiment was echoed repeatedly at yesterday's conference.

☐ Disarmament Ambassador Doug Roche set the tone of the meeting by saying that no country is better suited than Canada to "give leadership to the world" by promoting arms control.

☐ Dorothy Goresky, past-president of Physicians for Social Responsibility added a warning to Roche's comment.

"We seek security in the very thing that will destroy us," by relying on nuclear weapons to keep the peace, she said.

The challenge for peace activists, she added, is to "choose leaders who will effect change in the way we believe it should go."

☐ Geoffrey Pearson, executive director of the Canadian Institute for International Peace and security, called attention to a growing problem for the Mulroney government: The "gap between what governments think and what a lot of people think" about the likelihood of a nuclear war breaking out. The politicians don't expect one, but many voters do, he said.

Throughout yesterday's sessions, speakers and members of the audience repeatedly criticized the Mulroney government for its defence and arms-control policies.

The criticism comes as Defence Minister Perrin Beatty prepares Canada's first major review of defence policy since 1971.

Ottawa was described as being too timid to criticize the U.S. military buildup, Star Wars missile defence research and lack of interest in negotiating arms control agreements.

Ottawa was also censured for being too secretive in its defence agreements with the United States, including the recent renewal of our major defence pact.

Finally, the federal government was criticized for playing too active a role in the U.S. military machine.

Canada has phased out the last of its own nuclear weapons, yet we continue to help the U.S. test its unarmed cruise missiles here, Penner said.

We also allow nuclear-armed U.S. warships into our ports, accept U.S. plans to disperse bombers here in time of crisis, and help test numerous U.S. nuclear-capable weapons, Penner said.

Penner's remarks did not go unchallenged.

"Declaratory proposals and quick fixes proliferate in public debates such as this one," said Ralph Lysyshyn, a key spokesman for the Mulroney government on arms control.

"But experience has shown us that that no meaningful arms control measures have been achieved and sustained outside the negotiating framework" at places like Geneva, where progress is slow and often elusive.

"Megaphone diplomacy," of the sort advocated by many critics of the government, he warned, can be "dismissed out of hand," by the superpowers.

Lysyshyn, who was peppered with hostile questions, is director of the arms control division of the external affairs department.

Brig.-Gen. Don Macnamara, meanwhile, defended Canada's role within the North Atlantic Treaty Organization and the North American Aerospace Defence command as vital to our security and national sovereignty.

The Canadian Forces, Macnamara said, are "Canada's oldest and largest peace movement."

In a world where no fewer than 43 wars are being fought, Canadians should recognize that our defensive alliances have helped to preserve the peace between the superpowers for more than 40 years.

Macnamara was accompanied by a number of senior officers who mingled with the civilian audience answering questions about military policy.

9 November Session

Toronto THE TORONTO STAR in English 10 Nov 86 pp A1, A15

[Article by Gordon Barthos]

[Text]

EDMONTON — Prime Minister Brian Mulroney's government has been urged to cancel its limited support for U.S. Star Wars research.

The call yesterday came from 3,000 delegates attending a conference here on Canada's defence policies and national sovereignty.

They also urged the Progressive Conservative government to:

☐ Weigh the benefits of turning Canada into a "neutral" or non-aligned country;

☐ Halt cruise missile tests if the U.S. breaks current arms-control deals; and

☐ Lean on Washington to embrace a Soviet nuclear test moratorium.

Delegates also voted down a double-barrelled motion to support Ottawa in maintaining "an adequate defence capability" and in continuing to work within traditional Western alliances to promote nuclear and conventional arms control.

Arctic submarines

The votes, carried to hearty applause, were among 11 appeals and messages directed to the Tory government to mark the end of a two-day debate on Canada's defence policy and national sovereignty.

In total, more than 5,000 people attended the unprecedented meeting, organized by the Council of Canadians and the Edmonton chapter of Physicians for Social Responsibility. Initially, 500 were expected.

Before refusing to endorse an "adequate" defence for the country, participants complained that the term "adequate" was too vague to be meaningful. They noted that a major thrust of the meeting had been to question our traditional military links with other Western countries, including the United States.

The meeting also voted down a proposal that Canada acquire submarines capable of operating in Arctic waters and safeguarding our sovereignty. Questions were raised about whether the subs would have to be nuclear-powered, something many participants rejected.

"People strongly want alternative policies," Edmonton publisher Mel Hurtig said as the meeting ended. Hurtig is chairman of the Council of Canadians.

The public is worried about the nuclear arms race, Canada's geographic position between the superpowers and the federal government's policies on defence and arms control, Hurtig said.

"People like the idea of being involved in important matters," instead of being shut out of government defence decisions, he added.

Hurtig predicted that the Edmonton meeting will spur similar meetings in other communities, and said that they would play an important role in shaping public opinion before the next federal election.

Other meeting resolutions included:

☐ That Ottawa stop testing cruise missiles here if the United States exceeds the limits on missiles contained in current arms-control agreements. The U.S. has served notice that it may exceed those limits later this month.

This resolution, too, proved controversial. Many at the meeting wanted cruise tests banned outright, and were unhappy that a more moderate resolution had found its way on to the agenda;

☐ Ottawa should establish an arms-length commission to explore "alternate security possibilities" for Canada, including non-alignment and neutrality. The commission would hold public hearings and report to Parliament;

☐ Ottawa should endorse the Soviet nuclear test moratorium, and urge the U.S. to respond in kind;

☐ Ottawa should actively press both superpowers to negotiate upper limits on all categories of cruise missiles, which at present are largely unconstrained by arms control pacts;

☐ External affairs should be required to report to Parliament on the nature, quantity and destination of all Canadian arms exports;

☐ Ottawa should set up an international "crisis management centre" with a view to reducing the risk of accidental nuclear war;

☐ Ottawa should participate more actively in future conferences;

☐ Ottawa should restore the Canadian Broadcasting Corp.'s full funding to allow the CBC to upgrade its world coverage and to provide "clear windows on the world."

Earlier yesterday, George Ignatieff, former chancellor of the University of Toronto, received a standing ovation when he argued that Canada needs to develop a "strategy of survival" instead of relying on the threat of nuclear reprisals to keep the peace.

Canada can't realistically opt for neutrality, as military historian Gwynne Dyer proposed Saturday, Ignatieff said.

In a three-party political debate that followed Ignatieff's remarks, participants to the conference heard sharply conflicting views on Canadian defence policy.

Further Details

Toronto THE GLOBE AND MAIL in English 10 Nov 86 p A4

[Article by Matthew Fisher]

[Text] The 4,000 participants at a weekend conference on peace voted to ask the federal Government to establish an independent commission to examine alternative security policies, including the possibility of non-alignment.

The two-day meeting, entitled The True North Strong and Free?, adopted a resolution calling on Canada to endorse the Soviet moratorium on nuclear tests and to ask the United States to respond in kind. It also urged that Canada rescind its cruise missile test agreement with the United States and seek an arms-control pact that would regulate all categories of cruise missiles.

The delegates also concluded Canada should withhold all support for the U.S. strategic defence initiative, known as Star Wars. Motions to "maintain an adequate defence capability" to protect Canadian sovereignty and to acquire submarines and other forms of underwater surveillance for the Arctic were defeated.

Brig.-Gen. Donald Macnamara, of the National Defence College in Kingston, Ont., was one of five senior officers who attended the meeting, as did a representative from External Affairs and members of Parliament from the three political parties.

Many speakers objected to U.S. influence over Canadian foreign policy, including Canadian Labor

Congress president Shirley Carr, Robert Penner, co-ordinator of the Canadian Peace Alliance, and William Arkin, of the Institute for Policy Studies in Washington, D.C.

For the most part, the two-day debate, organized by publisher Mel Hurtig, was civil — although Ralph Lysyshyn, director of the arms control division of External Affairs, was jeered for not replying to a question equating North Atlantic Treaty Organization policy on a nuclear first strike with Nazi concentration camp ovens.

At a news conference later, Mr. Lysyshyn said that "some people wanted an inquisition," and he had expected it.

"A lot of people are here because they disagree with the Canadian approach to defence," he said, adding that the conference was worthwhile, which was why External Affairs had contributed to it financially.

In his speech on Saturday, Mr. Lysyshyn defended Canada's position in NATO and NORAD, as well as its voting record on nuclear disarmament and other military issues at the United Nations and other international gatherings. He said that if there is "a fairly strong congruence (with) U.S. votes, it is largely because we share many of the same values."

Gen. Macnamara described the strong military presence at the meeting as a departure for the Canadian Forces. "What you're seeing is an incremental process. A change in our participation is being encouraged."

He told delegates that Canada is, for practical purposes, a nuclear-free zone, while the Soviets have nuclear bases in its North.

Unilateral declarations are meaningless, he said. By belonging to military alliances, Canada has a voice when important military discussions are held.

George Ignatieff, University of Toronto chancellor and a former Canadian ambassador, was applauded when he urged that organizations such as the North American Aerospace Defence Command be changed so that civilians control decision-making processes.

"There should be no incineration without representation," he said.

Scientist David Suzuki, who resolutely opposes the SDI project, said that a major problem is "scientific illiteracy on the part of politicians," of which President Ronald Reagan is a classic example.

"Here is a man who grew up in a time long before there were computers, television, jets, rockets, satellites or nuclear bombs," Dr. Suzuki said. "He is making major commitments to SDI because he was nurtured on Buck Rogers comics."

Geoffrey Pearson, executive director of the Canadian Institute for Peace and Security and a former ambassador to the Soviet Union, said that a public inquiry into defence matters could not be held in Moscow but that there is evidence the Soviet Union is becoming more open.

/12828
CSO: 5220/5

CANADA: 'PROJECT PLOUGHSHARES' URGES TEST-BAN TREATY

Toronto THE TORONTO STAR in English 28 Oct 86 p A10

[Text] OTTAWA (CP) — Canada should "take the initiative" and publicly push the United States to negotiate a comprehensive nuclear test ban with the Soviet Union, says a coalition of 20 churches and anti-nuclear groups.

Project Ploughshares' political affairs co-ordinator Simon Rosenblum said yesterday there has been "some lessening" of traditional Canadian support for such a ban, and that the government of Prime Minister Brian Mulroney has been "a little bit soft" on concrete action.

Liberal external affairs critic Donald Johnston and New Democrat Pauline Jewett, in letters released yesterday by Project Ploughshares, reiterated their parties' support for an immediate moratorium on nuclear tests by both superpowers, and an eventual comprehensive ban.

/12828
CSO: 5220/10

ARGENTINA

NUCLEAR PROGRAM SAID CAPABLE OF ATOMIC BOMB

PY052232 Sao Paulo FOLHA DE SAO PAULO in Portuguese 4 Nov 86 p 6

[Article by Clovis Rossi]

[Text] Argentina has already produced sufficient plutonium to manufacture two or three atomic bombs at the Ezeiza nuclear complex alone. And each of these bombs will have the same power as the bomb that the United States dropped on the Japanese city of Hiroshima in 1945, causing the death of 140,000 people.

These data were supplied by Vice Admiral Carlos Castro Madero, retired, a former president of the National Commission for Atomic Energy [CNEA], in a recent interview he granted to the magazine MARCHA. He said that Argentina is in a position to build its own nuclear bomb and thus join the exclusive club of nuclear powers.

These same data have aroused suspicion about the Argentine nuclear program. As a matter of fact, there has been suspicion about this program, which started in the 1940's, since the dedication in 1974 of its first tangible achievement: the Atucha-I nuclear plant (110 km from Buenos Aires). That same year, U.S. nuclear proliferation expert John Redick of the Stanley Foundation warned in an article published in THE WASHINGTON POST: "Argentina has the scientific capability of very soon becoming a member of the exclusive nuclear club."

Nine years later, in 1983, Redick's warning gained higher levels of probability: In November 1983, Castro Madero, then president of the CNEA, reported that Argentina had mastered the nuclear fuel cycle at the secret Pilcaniyeu installations (2,300 km southwest of Buenos Aires), and was, theoretically speaking, in a position to manufacture the atomic bomb.

Now, once the fuel cycle is mastered, and the eminently political decision is made to manufacture the bomb, it is only a matter of time before one is built, and this time is measured in terms of weeks, a few months at the most. This means that in 3 years, Argentina might have its own bomb. The problem is knowing whether or not the political decision has been made.

Whenever questioned on the subject, the Argentine Government replies with a solemn denial and with declarations that the Aegentine nuclear program is exclusively peaceful. This answer is predictable. Not even Israel, which was caught red-handed by the British newspaper THE SUNDAY TIMES, admitted that it had the bomb. The newspaper quoted an Israeli nuclear program technician.

Castro Madero, an International Atomic Energy Agency consultant currently working for the Argentine Foundation for consultant currently working for the Argentine Foundation for Education, Science, and Culture, gave assurances that President Alfonsin has not made the decision to build the bomb.

The author of this article has confirmed that when it assumed power in 1983, the constitutional Argentine Government did not intend to continue any experiments on the military use of nuclear energy. The day Castro Madero announced that the nuclear fuel cycle had been mastered, a PMDB [Brazilian Democratic Mobilization Party] delegation headed by Ulysses Guimaraes arrived in Buenos Aires to meet with President-elect Raul Alfonsin the next day. Foreign Minister designate Dante Caputo (who still heads the Argentine Foreign Ministry) gave the author of this article a ride to Ezeiza airport. During the 40-minute ride, the informal discussion focused on Castro Madero's announcement. Caputo was very annoyed because he thought the objective of the announcement was to destabilize the newly elected government, which had not even been installed. He said that Alfonsin would not give a cent to the CNEA to continue the experiments that might lead to the construction of a bomb.

Ambassador Jorge Sabato, one of Alfonsin's closest friends, was designated Foreign Ministry under secretary, a position equivalent to that of a deputy foreign minister. Sabato and Brazilian Senator Fernando Henrique Cardoso, a member of the delegation headed by Guimaraes, have made similar statements on the subject.

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CSO: 5100/2036

BRAZIL

FORMER NUCLEAR OFFICIAL PROTESTS MILITARY ROLE

PY130216 Sao Paulo FOLHA DE SAO PAULO in Portuguese 11 Nov 86 p 16

[Article by correspondent Armando Ourique in Rio de Janeiro]

[Text] President Jose Sarney last month signed a decree subordinating the CNEN [National Nuclear Energy Commission] to the Office of the Presidency. In fact, however, that decree brought Brazilian nuclear policy planning under the control of the military cabinet, which can now set priority on completing the construction of the Angra II nuclear plant or on the construction of a nuclear submarine, the technology for which is being developed at the CNEN research department, which coordinates the parallel (read military) program.

This was the main reason civil and nuclear engineer Xamuset Campello Bittencourt resigned from his position as executive director for the security area and as a member of the CNEN deliberative council on 31 October. Campello Bittencourt left the positions he had occupied for 4 years at the CNEN to support suggestions from the Nuclear Program Evaluation Commission that the CNEN should be divided.

Campello Bittencourt believes that research activities must be transferred from the CNEN to Nuclebras and that nuclear installation safety must remain under the CNEN. Safety should be monitored by a collegiate body, some of whose members should be representatives from universities, which should be accountable and subordinated to a national Congress committee. Since 1967, Campello Bittencourt has worked at the CNEN, the Furnas Electric Company, and Nuclebras.

FOLHA: Why did you resign from the positions you held at the CNEN until 2 weeks ago?

Bittencourt: The committee in charge of evaluating the nuclear program recommended that the CNEN be divided into two organs. One of them to deal with nuclear research and develpment and the other to operate as a regulatory agency in charge of establishing operational standards and safety regulations. However, a decree issued in the 2d week of October subordinated the CNEN to the presidency, shifting control from the Mines and Energy Ministry. The area of nuclear safety and protection against radiation is specifically technical. The decision to subordinate this area to the presidency had given some hope for independence. However, we found out that we are subordinated to the National Security Council. Decree-Law 1,909, dated 7 October 1980, established a protection system that placed nuclear safety and protection against radiation under the jurisdiction of the National Security Council. Now that the CNEN has been transferred to the presidency, the CNEN's subordination to the council has become even stronger.

Thus, we are linked to a military organ and we see no reason for this. The recommendations issued by the evaluating committee must be followed if they are to yield any results. This means that nuclear security must be subordinated to the presidency, and that another organ must be in charge of research and development.

FOLHA: Considering that the presidential decree has not split the CNEN, to which group of presidential advisers will the CNEN be subordinated?

Bittencourt: In one word, to the National Security Council and to the military household. (General Rubens Bayma Denys is both the secretary general of the National Security Council and the chief of the military household). Consequently, the nuclear program is now under the military household.

FOLHA: Do you believe that the decree issued in October has strengthened Armed Forces control over the CNEN research area, in which the parallel program is being developed?

Bittencourt: Who makes the decisions in a parallel program? I believe that the CNEN's research activities should be transferred to Nuclebras (instead of remaining under the CNEN and, as such, under the military household). There is a nuclear program being developed by Nuclebras, which is legally responsible for the fuel cycle. The nuclear program should be a single unit. I do not see why part of it should go to Nuclebras and the rest remain within the CNEN. Nuclebras must be capable of developing the nuclear program to produce electric power from nuclear sources.

I do not know who is planning the parallel program. The parallel program is tied to the Navy program. By the way, I believe that the Navy program, the purpose of which is to build a nuclear submarine, has shown that Brazil is capable of developing its own nuclear technology provided the funds and determination exist to attain the objective. I believe Nuclebras does have this capacity.

FOLHA: Are you concerned over the fact that since the CNEN is actually subordinated to the military household, the latter might give orders on priority goals in military and nuclear areas, without due consideration to technical criteria?

Bittencourt: Yes, I am. The way things are, this concern is justified. Who designs the nuclear policy? The CNEN is legally charged with advising the presidency on nuclear matters. The decree has tied the CNEN to the military household. Who will then design the parallel program? I think there is concern over this point. And there are other economic factors as well. Nuclebras has its own program. It is slowly building Angra II, and its investments might even be lost, considering there is equipment in storage. It is necessary to conduct a study to identify the investments that must be given priority treatment.

FOLHA: What is the top objective of the presidency and the military household? Is it Angra II and the generation of electric power from nuclear sources, or is it the parallel program?

Bittencourt: The Nuclebras program is subordinated to the Mines and Energy Ministry. The Planning Ministry grants the funds for Angra II. The parallel program is funded by other sources. The funds for the parallel program come from the CNEN and probably from the Navy, which is conducting a program for the construction of a nuclear submarine. This is a military program. The subordination to the military household has thus placed a military program under the CNEN.

FOLHA: What are the other areas of the parallel program?

Bittencourt: The parallel program involves the development of materials, instruments, and all the components that might be necessary for a national program. It is necessary because the developed countries have banned the exportation of technology that might allow Brazil to become self-sufficient in this area. Consequently, it is necessary to produce these materials here.

/9599
CSO: 5100/2037

CNEN SPECIALIST DENIES LWR MORE DANGEROUS THAN CHERNOBYL TYPE

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Sep 86 p 22

[Text] Rio--The probability of a reactor such as that of Angra I becoming an atomic bomb was considered to be 1 million to 1 by the National Nuclear Energy Commission (CNEN) reactor division team refuting the allegation of U.S. specialist Richard WEbb to the effect that the Western World's light-water-cooled plants are more dangerous than that in Chernobyl and could explode like an atomic bomb without any warning as a result of the fission of plutonium in various compact mass packets.

The CNEN team comprised of Jose Eduardo Leme Salvatore (director of the reactor division), Jose Mendonca de Lima (responsible for the licensing of Angra I), Luiz Alberto Arrieta (specialist in the probability analysis of safety and accidents), and Clotilde Moreira de Pina (specialist in analysis of the reactor nucleus), showed that it would be practically impossible for an event such as that described by Richard Webb to occur and, even if an accident such as that in Chernobyl should occur with the release of radioactivity into the atmosphere, Sao Paulo and Rio de Janeiro would be better protected than the city of Kiev, 130 kms from the reactor accident site, for example.

The CNEN'S specialist in accident probability analysis, Luiz Alberto Arrieta, said that the Angra I reactor, with 5 centimeter-thick sheet steel shielding and a concrete building with walls 60 centimeters thick, is designed to withstand the meltdown of the nucleus. According to him, Chernobyl does not have a containment vessel and the reactor is protected only by an industrial building.

Arrieta explained that in the hypothesis of a thermal accident in which a conventional plant could explode, the water in the primary system would evaporate in a temperature of 290 degrees Centigrade and at 2,300 pounds of pressure, the equivalent of four atmospheres. That steel shielding was designed to withstand that pressure and that temperature.

In the hypothesis of the meltdown of the nucleus, the temperature would rise to 5,000 degrees Fahrenheit, or 2,800 degrees Centigrade, forming an incandescent magma that would pierce the reactor's base, penetrating the ground to a depth of up to approximately 8 meters. He guaranteed that the

"China syndrome" theory, according to which that ball of incandescent irradiated material could go through the earth's crust and reach China is pure myth.

According to Arrieta, tests conducted at PWR reactors in the desert of Idaho in the United States showed that that incandescent magma cools, exchanging heat with the ground when it reaches a depth of 8 or 9 meters. In the Three Mile Island reactor, the meltdown took only one-third of the reactor because the operators managed to activate the emergency cooling [system], interrupting the process of complete meltdown of the nucleus.

In case of an accident at the Angra I plant, the cube-shaped steel shield does not protect the ground side, unlike the German PWR system in which the shield is spherical and covers 100 percent of the reactor. Thus, in the event that a meltdown of Angra's nucleus should occur, the incandescent magma would pierce the concrete base and could reach a depth of 8 to 9 meters.

According to Arrieta, the possibility of an atomic bomb-type explosion would be almost impossible: 1 million to 1. That probability would occur in case the incandescent magma broke up into millions of droplets and those droplets encountered water. The temperature of those droplets would be so high that on coming in contact with the water they would cause immediate evaporation with explosive pressure.

The Case of Plutonium

Plutonium was also studied in the United States in the range of probable accidents with PWR reactors and it was determined that that element is spread over a space of 4 meters high by 2.5 meters in diameter, distributed over 28,000 little rods, in the case of a reactor of the Angra I type. That nucleus contains 60,000 kilos of uranium and approximately 30 kilos of plutonium. Five kilos of plutonium are enough to make an atomic bomb.

But in order for that atomic bomb to explode, those 5 kilos of plutonium must form a single critical mass containing only plutonium 239 and 240, which are the fissionable ones. That mass must be homogeneous in the case of the atomic bomb, while in the reactor it is spread out in small portions and distributed over a large physical space. Even with the meltdown of the nucleus, those 39 kilos of plutonium would be mixed with uranium, cast iron, and other metals, without the possibility of forming the critical mass of the atomic bomb.

According to the CNEN experts, the majority of those events have theoretical simulations and the "probability of a PWR plant exploding like an atomic bomb is the same as that of meteorite falling on our head." In the case of a Chernobyl-type accident, with the release of radioactivity into the atmosphere, if it were raining 99.6 percent of the radioactivity would remain within a radius of 3 kilometers.

In case the prevailing winds were in the direction of the sea, the contamination would affect fish and fishermen, besides the sea water. In the hypothesis of normal winds, or 7 kms per hour, it would reach Angra dos Reis, situated 15 kilometers from the reactor in 2 hours. In that case, everything would depend on the emergency plan. If it works, the population will be evacuated in less than 2 hours. Otherwise, that population can receive doses of radioactivity identical to those that were received by the population in the proximity of Chernobyl.

But for Rio and Sao Paulo, the danger is less than the one that was run by the city of Kiev, 130 kms from Chernobyl, with 1.5 million inhabitants, who did not have to be evacuated at the time of the accident. Jose Mendonca de Lima, responsible for the licensing of Angra I, pointed out that the Indian Point plant is 30 kms from New York, near Manhattan, with three reactors identical to that of Angra I in operation, and that the U.S. authorities do not even have an evacuation plan for that city of 10 million inhabitants. In case of an accident, the most that is planned for the Indian Point area is that the people stay home and take potassium iodide tablets to saturate the thyroid to prevent cancer from the radioactive iodine that would be released.

8711/12947
CSO; 5100/2016

OFFICIAL SOURCES CONFIRM NUCLEAR SUB DEVELOPMENT PROGRAM

Sao Paulo ESTADO DE SAO PAULO in Portuguese 5 Sep 86 p 5

[Text] The Brazilian nuclear submarine construction project has been made technologically feasible: the construction of a prototype centrifuge designed to enrich the uranium for the submarine's reactor has already been completed. That information was given to ESTADO reporter Helio Contreiras yesterday by a high-level government source. In his Rio office, Navy Minister Admiral Henrique Saboia refused to give any details about the report, alleging that the research is secret, but he said: "We do not have the right to give up such a project: to have a nuclear submarine in the future." Meanwhile, he stressed that the project concerns the construction of a submarine and not an atomic bomb.

According to the government source, the project is even further advanced than the stage reported by the press, and the construction of the first prototype centrifuge has already guaranteed the conditions for Brazil to develop the technology to get its nuclear submarine, which also requires a national capability in the construction of that type of naval vessel.

There is a national submarine design prepared by the Engineering Division of the Navy. In order to build its nuclear submarine, the Navy could not base itself on a foreign design, as is the case with the three units that will be built in the Rio Navyyard, based on the German Class IKL-209-1,400 design. In addition to that, the Navy is conducting research with the support of the Institute of Energy and Nuclear Research (IPEN) of the USP.

Confirming this report published by ESTADO on 19 June, Admiral Saboia said that a "nuclear submarine propulsion system" is being developed in the Sao Paulo municipality of Ipero. He explained: "The Navy felt the need for such a system in the course of time because whoever makes a strategic study of Brazil's interests on the sea and its future prospects will confirm that it is essential to have a nuclear submarine some day."

According to an official who has been following the process from the beginning, one of the problems encountered by the project of enrichment of uranium for the nuclear submarine concerned metallurgy but it has already been solved. The Brazilian nuclear submarine could be incorporated into the Navy within 10 years, depending on financial resources. That period, which could even be shortened, was calculated on the basis of the Navy's last two budgets.

The NUCLEBRAS subsidiary, NUCLEP, is participating in the construction of the first three conventional submarines in the Rio Navyyard and that could facilitate execution of the nuclear model. The minister said that the agreement has already been signed with the company.

Admiral Saboia stressed that there is a big difference between a project for the construction of an atomic bomb, "which does not exist," and that of an atomic submarine. "The nuclear propulsion system has nothing to do with that," he explained. "Brazil is building nuclear power plants that produce electric energy. The submarine propulsion system is simply a system intended to rotate the submarine's shaft and the reactor has to be smaller and much more compact because it operates within a closed hull; but that has nothing to do with nuclear arms.

"We are trying to achieve it," he added, "because nobody exports that technology and we have to develop it." According to the contract signed with NUCLEP, that state enterprise will be charged with the construction of the hulls of the first three conventional submarines scheduled to be built in the Rio Navyyard. The company will participate later in research for the nuclear unit.

Evidence

The Navy's facilities on the Ipanema tract in the municipality of Ipero in the Sorocaba region intrigue the city's mayor and councilors. They have already gotten together to obtain an explanation. Officially, the 38.72-hectare area is allegedly intended for the manufacture of steamship components. But for a long time, the politicians have suspected that something else was going on because of the security measures around the property, such as experiments with nuclear technology.

Maximiano and the Bomb

Former Navy Minister Maximiano da Fonseca said in Rio yesterday that he is in favor of the construction of a Brazilian atomic bomb. "If the decision depended on me, I would give the order to build the bomb and I would explode one just to show that that is all we had," he declared. The admiral regards the existence of a parallel nuclear program as normal, observing that it would not be possible to conduct research for military purposes under the agreement signed by Brazil with the Federal Republic of Germany in 1975, which has only "energy objectives."

8711/12859
CSO: 3699/16

BRAZIL

MINISTER DENIES NUCLEAR PROGRAM SUSPENSION

PY031650 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 1 Nov 86 p 26

[Text] Mines and Energy Minister Aureliano Chaves yesterday met in Rio de Janeiro with Licinio Seabra, president of Nuclebras and its subsidiaries, to deny reports that the nuclear program will be suspended after the construction of Angra III. The decision on the construction of other plants will be made only after 1989, "when we have more data to decide whether it is convenient or not," Seabra stated.

The ministers stated that during the meeting, "I ratified what has already been agreed on in the report released by the top-level experts. This report was already approved by President Jose Sarney: the nuclear program will continue. Now we are fighting for the flow of resources to be channeled so that the construction of Angra II and III is feasible." He added that the ministers of the economic team know that there is a document approved by the president of the republic and that they will have to put it into practice and release the necessary funds for the continuation of the program next year.

The minister added that, should the construction of the nuclear plants be delayed, the program will become unfeasible "as happened with the steel plants, which, in Brazil are some of the most efficient in the world. But the delay in releasing funds has placed Siderbras [Brazilian Iron and Steel, Inc] in a very difficult situation. With the hopes that there will be no delays in the construction of the nuclear plants, Chaves admitted that "the ministers of the economic area are having difficulties and that they have never displayed any discrimination against the atomic energy sector."

The minister does not know when Angra I will begin operating again, but said that "it will resume activities when tests prove that the reactor is in keeping with international security rules."

After the meeting, Seabra stated that President Sarney has decided to continue with the nuclear program, although he did not set any date for the construction of the other plants. The Nuclebras president added that the nuclear sector will need $1 billion for next year, $600 million of which will be used for servicing the debt, and the remaining $400 million for investments. "The continuation of the program is important because of the energy problems that the country is facing and in view of the establishment of economic growth during the next few years," he stated.

Seabra added that the minister "has expressed concern over the suspension of the nuclear program in case the resources are not released by next year." He said that, for the maintenance of the technical teams, there must be a minimum amount of work in the nuclear sector, guaranteeing at least a small amount of continuity in the program. Seabra added that "the construction of Angra II will not be delayed, despite a 50 percent reduction in the engineering work until the end of this year."

/9716
CSO: 5100/2033

SCIENTISTS OPPOSE NUCLEAR PLANTS, WEAPONS

Santiago EL MERCURIO in Spanish 3 Oct 86 pp C-1, C-8

[Text] Members of six academies of science have issued a statement on the need for reviewing measures against radiation and rejecting military use of such energy.

The Chile Institute, consisting of six academies of science, yesterday categorically rejected military use of nuclear energy; it concluded that there is no justification for installing nuclear plants in Chile for producing electric power, and it recommended review and evalution measures for assuring 100 percent protection against radiation in the country.

This statement is included in a document put together by Drs Amador Neghme and Ricardo Cruz-Coke of the Academy of Medicine; Igor Saavedra, Luis Vargas Fernandez, and Gustavo Hoecker of the Academy of Sciences; Carlos Martinez Sotomayor of the Academy of Social Sciences; Oscar Pinochet de la Barra of the Chilean Academy of Language; and Carlos Riesco Grez, general secretary of the Chile Institute.

In the note, along with rejecting the use of [nuclear] energy for military purposes, the institute suggested that activities be promoted to favor the denuclearization of Latin America. "To that end, it is recommended that international treaties and agreements signed by our country, promising to abstain from the use of nuclear weapons, be ratified without reservation."

It also explained that nuclear reactors have been shown to be a "serious risk factor" for living creatures, both plant and animal, including man, throughout the world and not just regionally.

Referring to Chile, the scientists pointed out that the risk of accidents is especially great in seismic countries like Chile and that therefore "internationally accepted technical standards and safeguards should be stressed." Further on they expressed their confidence that safety measures under the country's existing laws "will be strictly adhered to by the Chilean Nuclear Energy Commission."

On the other hand, they added, there is no present reason in Chile to build nuclear power plants, since the country already has ample capacity to generate electric power by conventional means, principally hydrolectric, and to supply the whole territory. "In any case, future evaluation of possible nuclear power installations should carefully consider the accompanying risks and should not be based exclusively on considerations of economic convenience of the moment," they declared.

The institute went on to recommend the review and evaluation of applying measures "for assuring 100 percent protection against radiation and for guaranteeing the isolation of radiation risk centers, as well as adquate elimination of radioactive wastes."

On the international level, they stated that it is necessary to register disapproval of nuclear explosions, most especially for those set off in the Pacific Ocean basin, and they propose to bring the institute's document immediately to the attention of the countries affected, in order to show their concern more forcefully.

"On the same basis, there should be further movement toward the total elimination of nuclear weapons and the endinf of all testing, production, and deployment of such weapons and their carriers. This would lead immediately to substnatial reductions in nuclear forces," they added.

In the last part of the text, it is recommended that the depositing of radioactive wastes or materials in the South Pacific and other seas be avoided, because of the potential dangers that that poses.

And in conclusion they point out: "Because of its fundamental importance for the continuation of human life, it is recommended that there be a permanent educational effort on the biological effects of ionizing radiations and of the weapons built on their basis."

Commenting on the text, the instigator of the initiative, Dr Amador Neghme, president of the Academy of Medicine, indicated that through this statement the scientists of Chile have done no more than share the concern for the problem that exists throughout the world. He indicated that Chile has enough water so that it does not need nuclear energy and can get along on hydroelectric power.

According to an attached report handed out at the institute, there are only two reactors in operation in Latin America, one each in Brazil and Argentina. Another five are under construction, two in Brazil, one in Argentina, and two more in Cuba and Mexico. In contrast, the United States has 101 plants in use and is building another 29.

12430/6662
CSO: 5100/2023

BRIEFS

CHARLES ON NUCLEAR 'EQUIPMENT'--Bridgetown, 17 Oct (CANA)--Dominica's Prime Minister Eugenia Charles last night indicated strongly her opposition to the presence of nuclear equipment in the vicinity of her island. I certainly don't want any nuclear equipment anywhere near me, that is definite, she declared. She spoke in a CANA Radio Crossfire programme, which discussed militarisation of the region. But Charles made it clear she saw nothing wrong with non-nuclear naval forces of friendly countries visiting her island. [Text] [Bridgetown CANA in English 1405 GMT 17 Oct 86 FL] /9274

CSO: 5140/010

BANGLADESH

BRIEFS

ABSENCE OF RADIOACTIVITY--Bangladesh Atomic Energy Commission on Saturday said that the Commission did not find radioactive substance in the imported milk powder and milk products. The environment of Bangladesh water, vegetables fish and meat were also found free from such radioactive substances by the Atomic Energy Commission. The scientists of the Bangladesh Atomic Energy Commission made a survey on the above products through survey metre of bita-gama. They found that the rate of radioactivity in Bangladesh is less than the rate fixed by the International Atomic Energy Agency for safe absorption in human body. The Atomic Energy Commission feels the necessity of removing the apprehension among the people after the Chernobyl accident. [Text] [Dhaka THE BANGLADESH OBSERVER in English 19 Oct 86 pp 1, 8] /13046

CSO: 5150/0047

'ABD-AL-MAJID CONFIRMS SUPPORT FOR UNITED NATIONS

Cairo AL-AHRAM: AL-TAB'AH AL-DUWALIYAH in Arabic 26 Oct 86 p 8

[Article by 'A'ishah 'Abd-al-Ghaffar: "International Support for the Egyptian Initiative to Set Up a Nuclear-Free Zone in the Middle East"]

[Text] Dr 'Ismat 'Abd-al-Majid, deputy prime minister and foreign minister, announced that the initiative that Egypt has brought before the United Nations General Assembly since 1974 for the setting up of a zone free of nuclear weapons in the Middle East wins wide-spread international support every year. He said that Egypt is carrying out its role to aid the United Nations and its special agencies specializing in serving the development goals in the Third World countries, and that the effectiveness of the role played by the international organization is the responsibility of all the countries of the world in order to preserve international security and peace.

The deputy prime minister and foreign minister added in his address at the ceremony held yesterday by the Egyptian United Nations League on the occasion of International United Nations Day, "The United Nations has played a major role in alleviating international conflicts. It has been a reflection of the changes that took place and take place in the international arena. For example, the organization was the first touchstone for the efforts of the developing countries to redress the shortcomings in the international economic system at the same time as the emergence of the league of developing countries known as the '77' League. This is the league that met in Egypt last August in a high-level meeting on economic cooperation between developing countries. The Cairo Declaration was issued from this important meeting. It comprises positive strategic groundwork for the future work for this economic cooperation."

He said, "We will not forget the role of the United Nations in the struggle against foreign occupation, its exploration in protecting the independence of developing countries, its concern for pressing international problems, and its keeping them alive in the heart of international society that is aware of their existence and interacts with their dimensions. We will never forget the United Nations' embrace of the Namibia problem without which it would have been lost in the forest of international relations and interwoven conflicts. In addition to that, the United Nations each year highlights the Middle East problem and the Palestinian question. It issues declarations that justly express the pulse of international society regarding the necessity of a solution to this problem, for the withdrawl of the Israeli forces from all the occupied Arab lands, and the realization of a comprehensive and just peace in the Middle East with the guarantee of the inalienable and legitimate rights of the Palestinian people including their legitimate right to self-determination."

Likewise Dr 'Ismat 'Abd-al-Majid reviewed in his address the Egyptian viewpoint in the international, Arab, and economic issues that he discussed with the foreign ministers of the countries of the world during his chairmanship of Egypt's delegation to the 41st session of the General Assembly.

Dr 'Abd-al-Ahad Jamal-al-Din, chairman of the Egyptian delegation to the United Nations, confirmed in his speech the importance of the stance against any effort to shake the confidence of international society toward the United Nations Organization, and in paying its agency specializing in combating financial difficulties. He said that the United Nations has represented, since its birth 41 years ago, a hope for the peoples eager for a world where security and peace prevail and in which the people's rights are guaranteed. Likewise, the United Nations has been a sanctuary for the helpless peoples.

He said that Israel and South Africa must implement the United Nations resolutions that relate to the right of the Palestinian and Namibian peoples to attain their freedom and independence.

Dr 'Abd-al-Ahad Jamal-al-Din directed thanks to President Husni Mubarak and the Egyptian Government for Egypt's continuous support of the United Nations and its special agencies.

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CSO: 5100/4604

WEEKLY URGES WITHDRAWAL FROM NUCLEAR TREATY

PM241351 Cairo AL-SHA'B in Arabic 14 Oct 86 p 1

[Editorial: "Face Them With Maximum Strength"]

[Text] The *Sunday Times* report on Israeli nuclear armament, which we are publishing today, may not be a surprise to observers of Israeli affairs. But there is no doubt that it is the first detailed report showing how Israel has turned the Dimona reactor into a plant for the production of nuclear bombs, affirming that Israel has a number of nuclear bombs ranging between 100 and 200, and indicating that Israel considered the use of nuclear weapons when it was beaten in the October war; an American airlift was the alternative to this option. The report confirms France's help for Israel at the early stages [of building the reactor] and we have no doubt that the ban on the Americans from inspecting the nuclear reactor does not mean that they had no knowledge of this development. Indeed what happened during the October war confirms the Americans' knowledge of this fact, which has often been reported in the Western media in the past years.

As we publish this documentary report, we would recall the Socialist Labour Party's [SLP] stand during the Al-Sadat era when we opposed Egypt signing the Treaty on the Nonproliferation of Nuclear Weapons when Israel refused to sign it so as to avoid the consequential inspection. We stressed at that time that this meant we were allowing Israel to proceed alone on the road to nuclear armament and so be able to impose its supremacy on the Arab region. We are not publishing the *Sunday Times* report today to spread fear and terror of Israel but to alert the the public in Egypt and to show our government the crime which it has committed against our national security since the Al-Sadat era and until now. Our government made a one-sided peace out of Camp David which is tantamount to surrender, while leaving our enemy armed to the teeth and able to strike at all fronts. We are not calling for tears to be shed over the past or sorrow to be shown, but we are calling for a responsible national stand to immediately bridge the gap between us and the Zionist enemy. Serious and continuous work will be capable of achieving nuclear balance. The government now has the right to announce the withdrawal of Egypt from the Treaty on the Nonproliferation of Nuclear Weapons. Egypt does not lack the material resources or the scientists, who have forged their way forward in this field since the sixties and also participated in setting up the Iraqi nuclear reactor before it was hit, but it lacks the willpower and faith.

If Israel was behind the leak of this report (despite the official denial), there is no doubt that its aim is to intimidate, alarm, and further humiliate us. We would say that we only lack the willpower, belief in Allah and the recovery of our fighting spirit, the 6 October spirit, as referred to by newspapers, in order to confront this Zionist contentiousness and its evil plans.

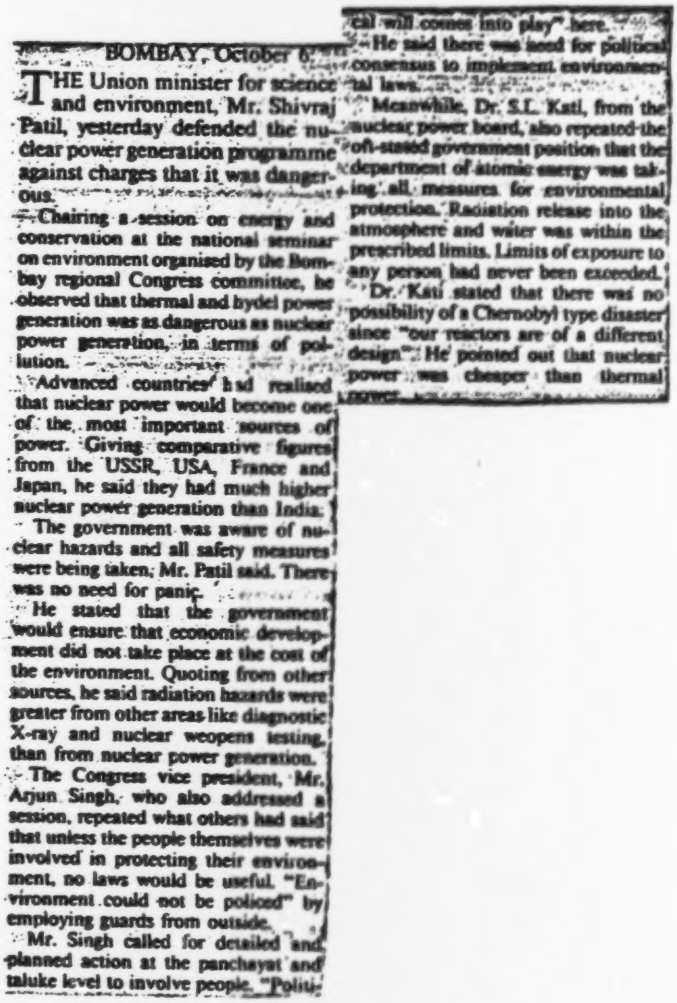
This question is not subject to competition among political parties. We confront the regime with its responsibilities; we cannot treat the fate of our country, civilization, and also our right to a free life with such contempt because history will have its say and also the people will have their say. We know that the defeatists will say "didn't you see...we are not up to Israel," but we answer them with the words of Allah, the almighty: Against them make ready your strength to the utmost of your power [Koranic verse]. God is great. And long live the people.

/9274
CSO: 5100/4603

MINISTER DEFENDS NUCLEAR POWER GENERATION

Bombay THE TIMES OF INDIA in English 7 Oct 86 p 23

[Text]



BOMBAY, October 6.

THE Union minister for science and environment, Mr. Shivraj Patil, yesterday defended the nuclear power generation programme against charges that it was dangerous.

Chairing a session on energy and conservation at the national seminar on environment organised by the Bombay regional Congress committee, he observed that thermal and hydel power generation was as dangerous as nuclear power generation, in terms of pollution.

Advanced countries had realised that nuclear power would become one of the most important sources of power. Giving comparative figures from the USSR, USA, France and Japan, he said they had much higher nuclear power generation than India.

The government was aware of nuclear hazards and all safety measures were being taken, Mr. Patil said. There was no need for panic.

He stated that the government would ensure that economic development did not take place at the cost of the environment. Quoting from other sources, he said radiation hazards were greater from other areas like diagnostic X-ray and nuclear weopens testing, than from nuclear power generation.

The Congress vice president, Mr. Arjun Singh, who also addressed a session, repeated what others had said that unless the people themselves were involved in protecting their environment, no laws would be useful. "Environment could not be policed" by employing guards from outside.

Mr. Singh called for detailed and planned action at the panchayat and taluke level to involve people. "Political will comes into play" here.

He said there was need for political consensus to implement environmental laws.

Meanwhile, Dr. S.L. Kati, from the nuclear power board, also repeated the oft-stated government position that the department of atomic energy was taking all measures for environmental protection. Radiation release into the atmosphere and water was within the prescribed limits. Limits of exposure to any person had never been exceeded.

Dr. Kati stated that there was no possibility of a Chernobyl type disaster since "our reactors are of a different design". He pointed out that nuclear power was cheaper than thermal power.

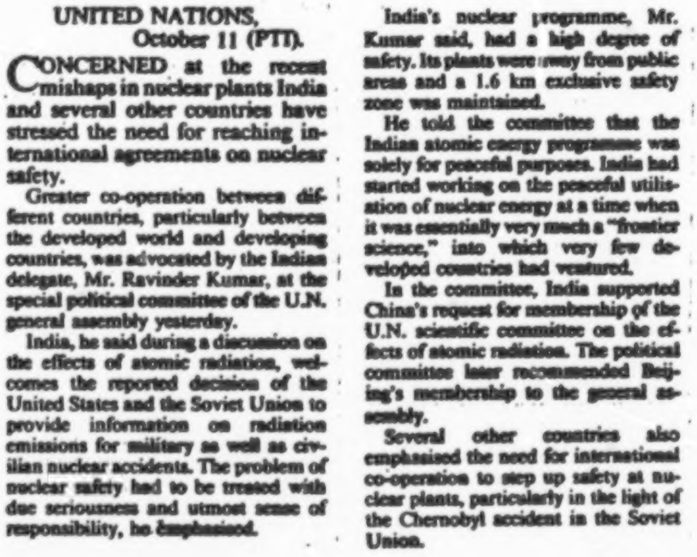
/9274
CSO: 5150/0036

INDIA

UN DELEGATE STRESSES IMPORTANCE OF NUCLEAR SAFETY

Bombay THE TIMES OF INDIA in English 12 Oct 86 p 8

[Text]



UNITED NATIONS,
October 11 (PTI).

CONCERNED at the recent mishaps in nuclear plants India and several other countries have stressed the need for reaching international agreements on nuclear safety.

Greater co-operation between different countries, particularly between the developed world and developing countries, was advocated by the Indian delegate, Mr. Ravinder Kumar, at the special political committee of the U.N. general assembly yesterday.

India, he said during a discussion on the effects of atomic radiation, welcomes the reported decision of the United States and the Soviet Union to provide information on radiation emissions for military as well as civilian nuclear accidents. The problem of nuclear safety had to be treated with due seriousness and utmost sense of responsibility, he emphasised.

India's nuclear programme, Mr. Kumar said, had a high degree of safety. Its plants were away from public areas and a 1.6 km exclusive safety zone was maintained.

He told the committee that the Indian atomic energy programme was solely for peaceful purposes. India had started working on the peaceful utilisation of nuclear energy at a time when it was essentially very much a "frontier science," into which very few developed countries had ventured.

In the committee, India supported China's request for membership of the U.N. scientific committee on the effects of atomic radiation. The political committee later recommended Beijing's membership to the general assembly.

Several other countries also emphasised the need for international co-operation to step up safety at nuclear plants, particularly in the light of the Chernobyl accident in the Soviet Union.

/9274
CSO: 5150/0042

BRIEFS

NUCLEAR PLANT SAFETY--Bombay, 7 Oct--Representative employees from various units of the department of atomic energy (DAE) today criticised the safety standards in nuclear plant all over the country, at a meeting held here today. The two-day meeting of the all-India atomic energy employees' co-ordination committee demanded the strengthening of the safety standards. "There has been a consistent violation of the existing standards at all DAE installations," Mr Ravindra Shukla, president of the committee said. The safety review committee, an internal DAE set-up to ensure adherence to safety norms, was "concerned with safety of (nuclear) plants, not human beings," Mr Shukla said. Workers in nuclear plants were not informed about the permissible dose of radiation and how much they had been exposed to, Mr Shukla added. The meeting passed a resolution opposing the formation of the proposed Nuclear Power Corporation. The nuclear industry would eventually land into private hands, leading to drainage of money from the public to the private sector, the resoltuion said. The meeting, which was held at the BARC training school hostel, was attended by 76 delegates and 35 observers, representing 19 of the 21 unions and associations in DAE units. [Text] [Bombay THE TIMES OF INDIA in English 8 Oct 86 p 8] /9274

CSO: 5150/0037

IAEA URGED TO CEASE COOPERATION WITH ISRAEL

JN040958 Baghdad INA in Arabic 0845 GMT 4 Nov 86

[Text] United Nations, 4 Nov (INA) — Iraq has called on the United Nations to urge the UN Security Council to take effective measures to force Israel to subject its nuclear installations to IAEA inspection and supervision. In a draft resolution submitted last night to the UN political and security committee, Iraq urged the IAEA to stop all scientific cooperation with Israel, which would help it reinforce its nuclear ability.

Iraq expressed concern over Israel's growing nuclear capability which poses a real danger to the Middle East region. Iraq also denounced the nuclear cooperation between Israel and the racist regime in South Africa. Iraq's delegate to the committee drew attention to Israel's claims of establishing a textile factory. He said this factory is in fact a large nuclear plant designed to manufacture fissionable materials used for military purposes, in addition to the Dimona factory which manufactures three nuclear bombs a year. He also drew the United Nation's attention to the fact that several officials in the world have previously stressed that the huge Israeli nuclear capability constitutes a true danger to the Middle East region. He called on the world states and the other organizations that continue cooperation with Israel in the nuclear field to stop this cooperation.

/8309
CSO: 5100/4507

ISRAEL

URANIUM EXPLORATION TO BEGIN

Jerusalem THE JERUSALEM POST in English 15 Oct 86 p 4

[Article by Bernard Josephs]

[Text]

A series of major projects, including a search for uranium, is to be launched in the Negev shortly by the Energy Ministry.

Minister Moshe Shahal said yesterday the aim is to turn the desert into a power plant for the nation.

"The Negev might be poor in many resources, but it is rich in energy," he said. "There is sun, there is oil shale and there is wind. Whatever the source of energy, if it is there we will find it."

The biggest single project is to be the building of a $26 million, five megawatt power station that will burn oil shale and produce electricity for the national grid.

In addition, several million dollars is to be spent in the next four years for research and development on the use of oil shale. Ministry officials pointed out yesterday that there are some 10 billion tons of shale in the Negev, enough to supply the country with electricity for the next 50 years.

Most of it is close to the surface, which cuts the cost of mining and limits the ecological impact of its extraction, they said.

The ministry is also to invest $1m. in an experimental wind turbine centre. Experts are currently looking for a suitable site.

Finally, $500,000 is to be spent in a hunt for uranium and other ores following indications that such deposits may exist.

These projects, combined with the building of a $4m. solar energy research centre at Sde Boker, represent a big effort to exploit the natural energy resources of the Negev, said a ministry official.

The Sde Boker centre, announced by Shahal at the recent Cannes international energy conference, indicates that experts believe so-called "alternative" energy sources could help provide an answer to future power needs.

/9274
CSO: 4400/46

PAKISTAN

ABDUL QADEER KHAN INTERVIEWED ON ATOMIC ENERGY PROGRAM

Lahore CHATAN in Urdu 31 Aug 86 pp 11-16

[Interview with Dr Abdul Qadeer Khan conducted by Younus Khalis: "Will Not Disappoint the Nation: Atomic Technology Essential for Survival; date and place not specified]

[Text] CHATAN had the honor of publishing the first detailed, very sensational interview with our great nuclear scientist, Dr Abdul Qadeer Khan, on 6 February 1984. NAWA-I-WAQT published the interview with Dr Khan on 10 February.

I had interviewed Dr Khan in two sessions, on 29 and 31 January 1984. That interview was reprinted by several foreign newspapers and journals after its first appearance in CHATAN. Rawalpindi's JANG reproduced it verbatim. Britain's most important news medium, the BBC, commented on this interview in its own special style. Several Indian newspapers with large circulations reprinted it on their front pages. Mrs Indira Gandhi was considering attacking Pakistan in those days, as both the Hindus and the Jews had their eyes on the Kahoota Research Center. The later assassinated prime minister of India was taken aback when this interview was published. All her designs on Pakistan were destroyed. "The Goddess" had to cancel all her plans. Political observers and veteran politicians have admitted that the timely publication of this interview in CHATAN and NAWA-I-WAQT saved Pakistan from a deadly Indian attack. CHATAN is very proud that its writing saved our country's unity and pride.

All patriots are aware that Israel and Hindus are our worst enemies. They conspire against Pakistan all the time. By the grace of God, all their efforts and evil designs against Pakistan fail. Pakistan is still here and will stay here with the help of God.

However, we must remember that the agents of these two powers are very active in our country. These agents are generally known as Qadianis. They are deceitfully working in every part of our country. Their presence in our atomic plants can be fatal to our country. According to our information, these Qadianis are not active against Dr Khan and want to harm him. Israel is helping them in this effort, and India is encouraging them. It is rumored that the pilot who betrayed our country and took training in Israel has been arrested. He has been punished, but our country must be very careful and alert regarding "these snakes in our own sleeves." In the past this group hurt our country in the form of the fall of Dhaka. They offered a huge sum to Indira Gandhi so she could accelerate her efforts to change East Pakistan into Bangladesh. This soul-shaking news was broadcast by the All India Radio. This was the very news that made Maulana Aslam Qureshi so emotional that he tried to kill M.M. Ahmad. It should be recalled that this fact is included in the case file, and that a newspaper carrying this news report on its front page is filed with the military court. This group is very active against Pakistan's atomic program, and the government should keep a close eye on it. The following interview was conducted in mid-1984 [as published] and is being reproduced.

[Question] Dr Sahib, you must be aware of the debate over the Kala Bagh Dam. Some people believe that generation of electricity would be more appropriate using atomic energy than hydropower. What is your opinion on this issue?

[Answer] There is no doubt that in the present situation atomic reactors are more efficient for meeting our electric power needs. However, we need trained experts for that, because it involves very complicated, sensitive technology. We know what happened in Chernobyl recently. We must have resources available to control the results of such an accident. We cannot depend on one form of energy production alone; we must have thermal and hydropower plants as well.

[Question] The superpowers do not want the developing countries to have nuclear capabilities. Can Pakistan develop nuclear energy using its own resources? What specific problems are there?

[Answer] It is true that the superpowers have imposed some unreasonable restrictions on the transfer of nuclear technology in order to keep their monopoly in this area. The experts also know that the developing countries need this technology for their development plans. As for Pakistan, there are fields such as agriculture, medicine, and electricity that cannot progress without the use of nuclear energy. In order to survive in this atomic era, we must have atomic energy. For this very reason, the Kahoota atomic plant came into existence through the efforts of Pakistan; engineers and scientists. We cannot be too proud of it. The only purpose of this plant is to produce nuclear energy for peaceful uses.

We faced many difficulties while building the Kahoota plant. The scarcity of our resources, the lack of cooperation from our neighboring countries, restrictions on the procurement of various items by the Western countries, poisonous propaganda spread by the international Zionist lobby, external interference, fears of attack by other countries, the high-handedness of our own bureaucracy, and the presence of such traitors as Mir Qasim in this subcontinent are some of the things that hinder our country's progress. Despite all these, our hardworking scientists and engineers managed to achieve some remarkable results. They worked very hard to achieve our goals, and finally succeeded in elevating Pakistan to the same level as industrialized nations in the field of atomic technology. Pakistan has kept its promise of using atomic technology for peaceful purposes only.

[Question] According to some experts, the Karachi electricity plant is located in an area where some subterranean geological changes can result in dangerous developments. What do you know about this?

[Answer] The Karachi plant was built under the supervision of international experts. They took every precaution, including a thorough survey of the seacoast. The subterranean geological changes were discussed, and those international experts did not think they would be dangerous.

[Question] According to an Indian scientist, India will make 2,732 bombs by 2000 A.D., and is capable of making 300 bombs at present. Do you think this is correct?

[Answer] India is a vast country with huge resources. It also has highly trained technicians. It does not have as many restrictions on the importation of materials from Western countries as has Pakistan. There are 13 atomic reactors working in India now, and it already conducted an atomic blast in 1974. In the light of all these facts, India is very capable of making many bombs by the year 2000. As for Pakistan, we have very limited resources and our atomic program is designed for peaceful use instead of arms development.

[Question] When the citizens of Pakistan become victims of India's designs or read this frightening news, danger bells ring in their minds. The question, will we be able to defend ourselves against a nuclear attack, arises in every mind.

[Answer] Pakistan's atomic program is not designed to attack any country. We want to maintain peace. We are sure that no neighboring country will attack us. Should there be an attack, I am sure that our scientists and engineers would be able to find ways to retaliate.

[Question] Which countries in the world are producing uranium using the centrifugal system?

[Answer] The Netherlands, Britain, and West Germany are producing uranium using the centrifugal system. Japan has also succeeded in this system on a laboratory scale. It should be remembered here that Britain and West Germany built a plant cooperatively to produce uranium using the centrifugal system. Pakistan amazed the whole world by succeeding in achieving the same results in the brief period of 7 years.

[Question] Is not designing a delivery system for a bomb a very difficult process? Are our top scientists capable of developing such a process?

[Answer] It is an accepted fact that any country that makes an atomic bomb also thinks about its delivery system. Since our program is not designed to make atomic bombs, the question of a delivery system does not arise. Our scientists have a lot of self-confidence since they perfected the very complicated and difficult process of producing uranium. They are capable of solving more difficult problems now. When needed and asked, they would be able to design a delivery system.

[Question] Dr Sahib, a respected scientist of our country has suggested that Pakistan should open the Kahoota Research Center for international inspection. What is your opinion on this?

[Answer] His statement is of a purely political nature. He has no political position in this country and is using this statement just to get attention. Such statements only show his political immaturity. He should explain the purpose of opening the Kahoota Research Center for international inspection. This center has become successful because of the hard work and diligence of Pakistani engineers and scientists. We did not use any foreign financial or technical assistance to build it. Nobody likes to open its house to strangers.

[Question] The same politician has also said in an interview that Pakistan should not make atom bombs. He said that it would be stupid for Pakistan to make bombs. Would you please comment on this?

[Answer] It appears that he is working for the United States, Israel, and India while still living in Pakistan. The fact is that our president and prime minister have repeatedly announced on an international level that Pakistan lacks the required resources and technology to make an atom bomb and that our program is geared to the peaceful use of atomic energy. We would be very proud if our scientists and engineers have the capability to make an atom bomb. The decision to make a bomb depends on our top leaders and not on a common scientist. It is the duty of every patriotic citizen to condemn such statements.

[Question] Dr Sahib, I believe that you read CHATAN regularly. Our journal has exposed the conspiracies of Qadianis several times. CHATAN has also exposed the efforts of this group to hinder our atomic program. Do you agree with the articles published in our journal?

[Answer] I agree with the facts about Qadianis' conspiracies against our nuclear program revealed in the weekly CHATAN. There is no doubt that the Qadianis have been working with the "Jewish" lobby against Pakistan's atomic program inside and outside the country. They are actively spreading false propaganda against Pakistan on an international level. They have used their influence on the Western countries to make problems for Pakistan.

[Question] A former minister in Mr Bhutto's cabinet told me that Mr Bhutto had decided against purchasing an atomic reprocessing plant after meeting with you. Did you agree with that decision?

[Answer] Since that former minister was a close confidant of Mr Bhutto, the late prime minister may have consulted him on this issue. People who know still believe that buying a reprocessing plant would not be cost effective. Those who had adivsed buying it obviously were ignorant of its appropriate uses. We only have one atomic reactor, and it would not be able to meet the demands of a reprocessing plant.

[Question] The same minister also said that Mrs Gandhi decided against bombing the Kahoota Research Center after reading your interview. She was frightened. Do you think this minister is correct in his assumption?

[Answer] His assumption is correct. Mrs Gandhi wanted to attack the Kahoota plant in the same way as Israel destroyed the atomic reactor in Iraq. The timely publication of my interview in NAWA-I-WAQT and CHATAN frightened her and forced her to change her plans. This assumption has been proved by vairous sources to be correct.

[Question] It is said that a case against you for stealing atomic secrets was filed on behalf of Israeli Prime Minister Begin. A Jewish woman judge sentenced you according to present plan. Since this case was all lies, we did not pay attention to it. Would you please tell us more about it?

[Answer] It is true that a case based on false accusations was filed against me in a Netherlands court. The Jewish woman judge ruled against me in my absence. Two of the three judges in that court were Jewish, including the woman judge, who was chairman of the panel. Thank God the higher court dismissed the case, decided in my favor and gave me an honorable acquittal. This decision not only made Pakistan proud but it also made the Jews look bad all over the world.

[Question] It is said that you needed some information from the Atomic Energy Commission for this case. You were denied the requested literature. Mr Munir Ahmad Khan advised his staff not to give you access to any information. Is this true?

[Answer] It is true, and a little painful for me. However, when I asked the internationally famous Dutch company, Philips, for this specific literature, they sent it to me immediately. The literature proved that this specific information about atomic reactors had been available to the public since 1930. This very literature helped in defeating the accusations against me.

[Question] The Kahoota center is named after you, as our president is impressed with the miracles you have worked there. Have you succeeded in the goals for which this center was established?

[Answer] Thank God that specific project was assigned to me by the government and I was successful in realizing the goals in a very short time. President Zia recognized this success by naming the center the Dr. A. Q. Khan Research Laboratory. I am very proud of this.

[Question] Would India be free of nuclear aftereffects if it were to drop atomic bombs on Pakistan? Could Pakistan defend itself in a nuclear attack?

[Answer] India is Pakistan's neighbor. India should not dare to attack Pakistan under the present circumstances. Should it decide to drop atomic bombs on Pakistan, it would have to be very careful in the selection of those bombs to assure its own safety. As for Pakistan, its atomic program is designed for peaceful uses only. Our president and prime minister have told us this many times. Should nuclear defense technology be required, I am sure our engineers and scientists would not disappoint the nation.

[Question] According to some prearranged plan, our citizens are being frightened with a possible atomic attack by India. In this psychological warfare, your words are like a light in the dark. You help our countrymen to gain courage. Each word you say makes them feel better.

[Answer] Many traitors are present in our country. They try to frighten people. We all believe in Almighty God, and I am sure that such tactics will not adversely influence our brave citizens. As for me, despite my being busy in research, whenever there is a need I will share my views with people and keep them informed. Our citizens are very stable people and they can stand any psychological warfare.

[Question] Are science and technology two different branches, or one and the same thing? I am asking this question as some of our leaders are advising the government to focus on the development of sciences, and they do not think technology is important.

[Answer] Science and technology are two different fields, but they are so interdependent that they cannot be separated. Science gives birth to a theory, and technology puts the theory into practice. Their relationship to each other can be compared to the relationshjp of body and soul. Technology is the body and science is its soul. The body moves as the soul dictates. Science belongs to scientists, and technology to engineers.

7997/12624
CSO: 5100/4703

PAKISTAN

CHERNOBYL-LIKE ACCIDENT AT KANUPP RULED OUT

Karachi DAWN in English 22 Oct 86 pp 1, 6

[Text] **KARACHI, Oct 21:** A Chernobyl-like accident cannot take place at the Karachi Nuclear Power Plant (KANUPP) accordin to a safety review of the Plant's operation undertaken by the PAEC Nuclear Safety Committee soon after the tragic reactor mishap in the Soviet Union, says a report in Pak Atom, PAEC.

The review rules out the occurrence of a Chernobyl-type accident on the grounds that KANUPP, unlike the Chernobyl reactor, does not use graphite as moderator, has a sturdy and reliable containment, and is provided with back-up arrangements for removal of excess heat.Nevertheless, a number of suggestions recommended by the Nuclear Safety Committee to beef up the existing safety measures at KANUPP are under implementation.

It will be recalled that in early 1985, an IAEA Operational Safety Review Team (OSART) had performed a through review of KANUPP's safety regime. It concluded: KANUPP's safety was satisfactory but suggested several improvements. Many of its proposals have already been implemented while others are under execution.

Alsi, a report recently prepared by the Senior Health Physicist of KANUPP, *inter alia*, mentions: "KANUPP has operated well within the current safety limits presribed by or deduced from the International Commission on Radiological Protection (ICRP) recommendations. The operating personnel were never subjected to excessive radition doses and adequate safety measures remained, available to monitor and counter any potentially hazardous situation.

Similarly, the environment was not subjected to any significant radioactivity burden and the radioactive releases from KANUPP constituted an insignificant (less than 1%) fraction of the amount permitted by safety limits...Over the years the plant has functioned normally and the adequacy of the safety and monitoring equipment (and procedures) has never been severely strained. **CHERNOBYL's IMPACT ON PAKISTAN:** There has been no direct physical impact of the Chernobyl accident on Pakistan. The atmosphere and vegetative environment sampled a several localtions throughout the country showed no significant change in normal background levels. The normal radiation background at Islamabad, for instance, corresponds to an exposure of about 150 mRem per year. After the Chernobyl accident, the maximum recorded background radiation corresponded to a value of 230 mRem per year. The internationally accepted permissible exposure to the general public is 500 mRem per year over and above the natural background prevailing in the area. In other words, the very slight increment in enviornmental radioactivity which persisted for a few weeks after Chernobyl was far too low to cause any concern whatsoever. Even that slight increase has now virtually disappeared.

PAEC has a fullfledged Directorate of Nuclear Safety and Radiation Protection (DNSRP) and a high-level Nuclear Safety Committee (PNSC) which periodically review the design, operational procedures and practices at nuclear installations in Pakistan. The Commission's work in this area will be further strengthened in cooperation with IAEA and friendly countries.

/12104
CSO: 5100/4708

UK PAPER: SECRET PLANT COULD MAKE NUCLEAR ARMS

PM101239 London THE DAILY TELEGRAPH in English 10 Nov 86 p 7

[Article by technology correspondent Roger Highfield: "Secret S. Africa Plant Could Make Nuclear Weapons"]

[Text] South Africa will be in a stronger position to build nuclear weapons when its uranium enriched plant at Valindaba goes into operation next year.

The secret plant, which is half an hour's drive from Johannesburg, will become a new bargaining counter in negotiations with the West over sanctions, according to Mr Peter Lomas, a consultant researcher at the Stockholm Peace Research Institute.

An investigation into the capabilities of the plant conducted by Mr Lomas concludes that there is no doubt that the plant can produce uranium enriched enough to make nuclear weapons.

Natural uranium is a mixture of isotopes containing only a fraction of a per cent of uranium 235, the fissile form. Commercial nuclear reactors need fuel containing around three per cent, bombs require much more, which is where the process of enrichment comes in.

Mr Lomas speculates that the enrichment complex at Valindaba could be put to one of three uses:

Nuclear Weapons.

Nuclear fuel to supply the country's two French-built 1000mw reactors at Koeberg, when contracts with the French run out and the country faces embargoes on the import of nuclear fuel.

A strategic stockpile of enriched uranium, for use as a bargaining counter in negotiations with the West and from which to earn foreign currency.

Of the three, he believes it is the last that the South Africans are pursuing. "I believe that they may have had a weapons programme, that they may have had nuclear weapons, but I do not believe that they have any use for them because of their overwhelming convential forces."

The enriched uranium will be used in the production of nuclear fuel, a capability which is under development at the neighbouring Pelindaba site, though Mr Lomas said it would not make much of an impact on sanctions.

However, he said that the West would be anxious to try to exert some control over the enriched uranium, a strategic material, which could be exported from South Africa next year.

The semi-commercial plant at Valindaba will have a capacity of 300.000 separative work units, the method used to measure quantities of enriched uranium, modest in comparison with the handful of enrichment plants elsewhere in the world.

A spokesman for the Atomic Energy Corporation of South Africa said the plant would only produce uranium enriched to a level of 3.25 per cent-that required to make fuel for the country's two commercial nuclear reactors at Koeberg, near Cape Town, making South Africa self-sufficient in this respect.

He added that they were investigating laser enrichment of uranium a highly sophisticated method.

Mr Lomas said there had been speculation that South Africa had built a "mini nuke" for their 155mm artillery piece, and that they had materials to make a neutron bomb.

Mr Lomas said the South Africans had been shrewd in the way they had tried to negotiate inspection by the International Atomic Energy Agency, the international watchdog which checks on diversion of strategic materials. Negotiations between the two fizzled out in the summer when the Agency refused to work under the conditions outlined by the South Africans.

The heart of the disagreement was, according to Mr Lomas, that the South Africans would for instance, only provide inventories of materials passing in and out of the enrichment plant, claiming that the "Helikon" enrichment process, which was indigenously developed, was commercially sensitive technology and that "intrusive" inspection was impossible.

In this way the South Africans preserved the status quo-an enrichment facility without international inspection-after apparently entering negotiations in good faith, said Mr Lomas.

/8309
CSO: 5100/6

SOUTH AFRICA

IAEA SUSPENDS NEGOTIATIONS ON NUCLEAR FACILITY

MB031000 Johannesburg Domestic Service in Afrikaans 0830 GMT 3 Nov 86

[Text] A spokesman for the South African Atomic Energy Corporation has confirmed that the IAEA suspended negotiations 6 weeks ago relating to international guarantees for the uranium enrichment facility at Pelindaba near Pretoria.

The spokesman told our Pretoria news staff that there is confusion about the international guarantees applicable to the three South African nuclear reactors. The suspended negotiations concerned only the uranium enrichment plant, he said, and not the nuclear reactors. No reasons had been given for the suspension of the negotiations.

The statement by the Atomic Energy Corporation follows accusations earlier by a Zimbabwean minister that South African nuclear reactors are not subject to international guarantees and pose a security threat to southern Africa.

/8309
CSO: 5100/6

U.S. DATA SHOWS PAKISTAN ON BOMB 'THRESHOLD'

LD042103 Moscow TASS in English 1631 GMT 4 Nov 86

[Text] Washington November 4 TASS -- Pakistan detonated a high explosive device last September as part of its continuing efforts to build a nuclear weapon, THE WASHINGTON POST reports. This information is supplied by a classified Defence Intelligence Agency report, which points out that it was Pakistan's second such test this year as it is trying to perfect a nuclear weapons triggering package. Meanwhile, a Pakistani atomic plant at Kahuta is enriching uranium to a sufficient level to make a bomb.

All this information, gathering by the U.S. intelligence services, shows that Pakistan is on the threshold of producing weapons of mass annihilation -- "two screwdriver turns" from having a fully assembled bomb, as the newspaper says.

Meanwhile, Washington is closing its ear to ever new reports about Pakistan's efforts to develop nuclear weapons. Contrary to facts which are well known to the U.S. Administration, President Reagan certified to Congress last month that Pakistan was not developing nuclear weapons. The word of the White House chief gives the "green light" to another package of U.S. military and economic aid to the value of 600 million dollars to Pakistan.

A senior administration official, THE WASHINGTON POST says, publicly said that keeping Pakistan from obtaining a bomb is a low priority on the list of Administration foreign policy goals. According to that source, the reason is Pakistan's willingness to help the administration by acting as a pipeline for the hundreds of millions of dollars in CIA covert assistance that is provided to the Afghan counter-revolutionaries -- a top priority for Reagan and his administration.

/9599
CSO: 5100/8

USSR

ROUNDTABLE DISCUSSION OF NUCLEAR ENERGY IN USSR

LD181004 Moscow Television Service in Russian 1515 GMT 17 Oct 86

[Roundtable studio discussion entitled "The Chief Job of the Peaceful Atom" moderated by Yuriy Aleksandrovich Ulyanov, with Academician Anatoliy Petrovich Aleksandrov; Academician Valeriy Alekseyevich Legasov, first deputy director of the Kurchatov Atomic Energy Institute; and Viktor Ivanovich Dobrokhotov, chief of the Power and Electrical Engineering Department at the USSR State Committee for Science and Technology; video shows studio discussion --live or recorded]

[Text] [Ulyanov] Hello, comrades! As we all know, a CEMA session last December adopted a comprehensive program for scientific and technological progress in the CEMA countries up to the year 2000. Among the program targets there are several chief ones--or priority targets, as they are called--and these include the accelerated development of the atomic power industry. Why is the atomic power industry allocated a priority role? What problems have there been in this field, and what problems have perhaps arisen of late--particularly as the comprehensive program was adopted last December, and the events at Chernobyl with which we are all familiar took place this April?

[Aleksandrov] You know, first of all I would like to make a slight amendment to what you said in your introduction. We are not of the opinion that our country is the world leader in atomic energy. We are, of course, in a good position, but there are a whole number of countries which have developed atomic energy on a larger scale since the start, and that development, as you know, began in our country, where the first station was built. But afterwards construction developed at different speeds, simply depending on how many and what kind of fuel resources existed in each individual country. The difficulties that the United States had with fuel forced it to build a considerable number of stations quite quickly. Similarly, a severe fuel deficiency, an insecure supply of fuel from the Middle East and the increased cost of that fuel forced France to develop atomic energy very quickly, and they satisfy about 45 percent...

[Legasov--interrupting] Sixty-five percent...

[Aleksandrov] Sixty-five percent of their requirements...

[Legasov--interrupting] of their electricity requirements.

[Aleksandrov] ...of their electricity requirements by means of atomic power stations, while in our country it is only 11 percent. Nevertheless, it was quite right that the decision was taken to develop the atomic power industry at an accelerated pace in the CEMA countries. The reason is that fuel resources--and in our country they are, thankfully, in good shape and they are in large quantity--are becoming more and more expensive. The fields that we had in the western part of the country, for example the Donbass and Baku, now play virtually no role. The Siberial fields are having to be developed, so we are continually moving further east to find fuel supplies. This fuel has to be transported over long distances. This increases the price, and it creates a situation whereby atomic energy in our country is substantially cheaper throughout the whole of the western part of our country to the Urals than energy derived from traditional fuel.

[Ulyanov] What about the plans for the future, Anatoliy Petrovich, the thing I was asking about: Have they changed since April?

[Aleksandrov] Well, of course in all our further plans, and also in our actual construction work, we have to take into account the lessons drawn from the Chernobyl accident. It would simply be impossible not to take them into account, and this will lead to certain changes in the plans. However, the development of the atomic energy industry will nevertheless continue, and will continue on the scale that is intended, or approximately on the same scale. But, of course, serious technical, educational and other measures will be taken to reduce the risk involved in atomic energy.

[Ulyanov] But there's no alternative to it.

[Aleksandrov] There's no alternative, and we must bear in mind that in fact, as the last world energy conference showed, the world resources of conventional fuel including even coal may be exhausted within the next 150 years.

[Ulyanov] Viktor Ivanovich, you have had the opportunity to visit several foreign power stations. Could you, as a construction and power specialist, say why our fraternal countries, for example Bulgaria, Czechoslovakia, Hungary and the GDR, have such an interest in the accelerated development of the atomic energy industry?

[Dobrokhotov] First of all, Yuriy Aleksandrovich, I would say that this interest is based on the great amount of scientific research that has been carried out in many countries, or I would even say in all of the countries in the CEMA, together with our scientific research organizations, which have studied all the possible options for the development of our countries' fuel and energy complexes to find the possible paths of that development. And the result of all the research, briefly, is the conclusion that there is no alternative development aside from atomic energy to compensate for all the negative phenomena involved in the development of the fuel and energy complex. So behind this acceleration in the development of the atomic power industry there stands a great deal of work by scientists and researchers. It wasn't just someone who thought it was a good idea and said, let's develop the atomic power industry. Calculations were made, and they were backed up. They took into account the development not only of our countries, the CEMA countries, but that of the world energy system as well. Furthermore, I would say that today our scientists and power industry specialists are talking about the need to develop the atomic power industry also for supplying heat--not only to generate electricity, but also to use atomic energy to provide city heating, hot water, and for other purposes.

[Aleksandrov] And even for production engineering.

[Dobrokhotov] And even, in the future, for the development of production engineering.

[Ulyanov] And that is so for all the countries?

[Dobrokhotov] That is our general line which was supported; it is the joint line of the CEMA member countries.

[Ulyanov] Viktor Aleksayevich, you were at the session, or the conference, as it was called, of the International Atomic Energy Agency, the IAEA, in Vienna. What were the chief results of that conference, and what is being said in the rest of the world about the further construction of atomic power stations?

[Legasov] More than 500 specialists in the field of atomic energy, medicine, safety, and general energy came to Vienna because they were alarmed by the circumstances involved in the accident at the Chernobyl power station, in a similar way to the sentiment that you expressed when you opened our meeting today. The specialists wanted to find out whether they should alter their plans and what it would mean. Well, what were the results of the conference? First of all I would like to say that before the meeting, when the specialists were using chiefly newspaper information--often information from non-Soviet newspapers which was not always accurate and sometimes simply completely inaccurate--the specialists were as yet unable to express a view. But the first result was that the specialists are now talking the same language. They have all found out what the Soviet reactor where the accident happened is like, what safety measures were built into the design of the reactor, how the staff operated, and what mistakes they made which led to the tragic events at Chernobyl.

The main conclusions that were drawn there are as follows: First, that the replacement at the present time of the nuclear power industry, by means of which 15 percent of all electricity in the world is now being produced--if this 15 percent were to be replaced by coal, gas or oil sources, then there would be an incredible increase in the amount of organic fuel being transported, burned and extracated. Here I am saying nothing of the permanent effect on people's health--the permanent effect of the carcinogenic components which are given off during the burning and extraction of coal, for instance, and from other organic power-industry sources that we use. There would be considerably more of this long-term negative effect on people's health. The second conclusion reached was that this nevertheless does not mean that the nuclear power industry, to which such a substantial role is being assigned even at the present time, and even more so with regard to its development, should be preserved in the form in which it now exists where there has been the American accident at Three Mile Island in 1979, the very big accident at Chernobyl that occurred in our country and an accident in the FRG. Accidents sometimes occur with this complex and power-intensive equipment that can lead to major consequences. Consequently, work on the safety of nuclear sources must be pursued even more intensively than it has been till now.

[Ulyanov] Anatoliy Petrovich, I have had occasion to read in the western press highly positive assessments of the work of the IAEA and in particular of the Soviet delegation, which was there and gave a very frank account, comrades, of the events at Chernobyl, and so forth. However,some western mass information media have been speaking in general about the imperfect design of the reactor and claiming that it lacked some sort of concrete cover, and so on.

[Aleksandrov] You see, Valeriy Alekseyevich has just named the three or four major accidents that we know about in the atomic power industry. There has been the British accident, the German accident, the American one, and ours. But the following should be said, namely, that these accidents occurred in the most diverse types of reactors.

[Legasov] At the conference that we were speaking about the conclusion reached by the experts was that every technical device and every reactor has pluses and minuses, because in resolving, say, the problem of economics one worsens, say, some problem of control, and in improving the control system one worsens economics. This reactor had clearly-expressed advantages and some shortcomings, and the safety system and the control system were built with account being taken of the shortcomings of the reactor.

[Aleksandrov] That was so.

[Legasov] That is to say that the monitoring system, the protective system and the technical regulation were made with account being taken of the shortcomings. They, as it were, compensated for the shortcomings in the design by corresponding additional elements and the regulatory procedures in force. But on this occasion the personnel managed to act in such a way that all these compensatory systems were switched off, and then the reactor with its shortcomings found itself without all those technical devices, the creation of which had been directed at seeing that the reactor was controllable, reliable and tranquil. It was then that the event occurred.

[Ulyanov] So it is not a matter of the concrete cover, which should...

[Aleksandrov--interrupting] It is absolutely not a matter of the concrete cover. No sort of concrete cover can protect against a powerful explosion. In the final analysis this was understood too by the experts who examined our reactor from that point of view. One cannot say that all the best technical solutions have been chosen in atomic reactors and this new sphere of technology.

[Ulyanov] But it is not a question of some fundamentally new thing.

[Aleksandrov] We are trying continually to modernize them and are endeavoring to find more reliable solutions. Our reactors of following generations, of course, have always been better than the older generations reactors. That is all provided for; nevertheless shortcomings exist, and are sometimes detected during operation--shortcomings in the design or in this or that equipment. There are also cases of defects that result quite simply from the poor quality of manufacture of this or that component. We try, of course, to combat this intensely.

[Ulyanov] What is the degree of involvement of our fraternal countries in the construction of reactors and in the construction of new power stations?

[Aleksandrov] Well, for the water-cooled type of reactor, even the reactor buildings and parts of the reactors are made by these countries. In Czechoslovakia, for example, the Skoda Works manufactures reactors of 500,000 kw capacity, or 440,000 kw capacity.

[Ulyanov] On license from us?

[Aleksandrov] Yes, on license from us. It is our license, the specifications for the metals are ours. We have very good metals that are employed. That then is what they do.

[Ulyanov] What about Hungary, Bulgaria and the GDR?

[Aleksandrov] Each makes its contribution. Some of them make pumps. Even some of the protective systems are made there.

[Dobrokhotov] They make transfer machines and fittings.

[Legasov] Separator drums.

[Aleksandrov] Yes, they make separator drums.

[Legasov] The Czechoslovak side makes steam generators for our countries.

[Aleksandrov] That is so.

[Dobrokhotov] I would say, Anatoliy Petrovich, if I may, that this is one of the forms. We do have another second form. For instance, we have reached agreement on the construction on our soil of the Khmelnitskiy station. Each country makes its contribution, as it is called, and when the station is built at Khmelnitskiy electricity supplies will serve as payment for their contribution. This is another form of cooperation by our countries in resolving power-industry problems.

[Ulyanov] In the west claims are very frequently made that the Soviet Union foists outdated technology on its CEMA partners.

[Dobrokhotov] Well, I would answer this question as follows. One can say anything, and the other will withstand anything. But this must be proved, and, if we turn to the facts and facts are stubborn things, they speak of the reverse.

[Legasov] Incidentally, to come back to the experts, the specialists: I've not heard such a formulation as, your stations are nothing like ours, once from specialists. That slips out sometimes in journalism, but when the specialists were meeting the conversation was different. The attitude is very respectful to some technical solutions, for example, toward the fuel, the material of the building and the logic of certain systems which have been created in our country. The attitude is very respectful. And then indeed we can talk about, for example, a station such as the Loviisa station, built in Finland and based upon our Soviet reactor, the water-cooled 400. Anatoliy Petrovich was recalling it. And Finland built it with our technical assistance and with our ideas about stations. It's a splendid station, one of the best in the world. Or if you travel to the Paks station in Hungary it's a magnificent station. Any specialist in the world will say that it's a most modern station, not inferior in all its elements to any station in the world.

[Ulyanov] In other words Anatoliy Petrovich, we occupy a good place in the world in terms of...

[Aleksandrov--interrupted] No, I didn't mean it was bad. It's not in the least bit bad. Here I think that the level is the same, both in our country and abroad. In some places they are ahead and in others we are ahead.

[Ulyanov] We've been talking here about the future of atomic power stations, in particular the creation of thermal atomic power stations which will supply heat for cities.

[Legasov] We are saying that in the long-term specialized sources may appear for the production of heat, which produces only hot water or steam and which don't produce electricity.

[Dobrokhotov] In September groups of experts from CEMA member countries got together to consider technical-economic reports in the field of heat supply from various nuclear sources and they all generally confirmed the position laid out before the Chernobyl accident. So this is very typical, that in general in the countries of our community the position regarding the development of nuclear energy to supply heat remains the same as it was before the accident at Chernobyl. And in particular the expediency and the economic nature of speeding up this work so that in the near future the main indices for the development of this trend can be clearly defeined, has generally been confirmed. We are leaders here. The Soviet Union emerges here as a leader in these matters. Today two stations are being built in our country--atomic heat supply stations--in the city of Gorkiy and in the city of Voronezh, so we should gain experience here for further development. TETS atomic power stations which you mentioned are being built in our country. They combine the production of electricity and heat. They are being built in Odessa and Minsk.

[Legasov] And in Kharkov, I think.

[Dobrokhotov] Kharkov is being planned while Minsk and Odessa are already real installations where construction is underway. I should say, moreover, that very interesting technical solutions have been found. For the first time a large stream extraction turbine with a capacity of 1 million kw has been created by the Kharkov turbine works and it is to undergo tests at the Minsk station. I think that all this will make it possible to determine more clearly the path for the development of this trend in the CEMA member countries. This is one of the directions in our program which we are considering here today.

[Ulyanov] In a word, the peaceful atom has many problems; it runs ships in the Arctic and helps scientists to penetrate the secrets of the microworld in work on accelerators; and it also helps geneticists and plant breeders. But the main task of the peaceful atom is--what would you say, Anatoliy Petrovich?

[Aleksandrov] Energy of all types, both for obtaining heat and electricity and for maintaining thermal conditions for various kinds of production engineering, and for direct participation, with the help of plasma processes, in production engineering. This is a completly new direction which is being developed in particular in the institute of atomic energy by Valeriy Alekseyevich and his teams. And I, for example, think that this is a path which truly does not have any alternatives.

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CSO: 5100/005

USSR CITES NORWEGIAN OFFICIAL ON ISRAELI NUCLEAR PROGRAM

Moscow IZVESTIYA in Russian 20 Oct 86 p 1

[Article by V. Mikheyev: "Inspection Will Give the Answer"]

> [Text] The government of Norway is reviewing the question of carrying out an inspection of Israel's nuclear facilities to determine whether or not the heavy water sold to them in 1959 was used for the production of nuclear weapons. P. Paust, a representative of the Norwegian Ministry of Foreign Affairs Oslo, announced.

As P. Paust explained to REUTER, the report of the English newspaper SUNDAY TIMES about Tel Aviv's 20-year long possession of their own nuclear arsenal prompted this step. As IZVESTIYA has already written, on 6 October the experimental reactor in Dimon, in the Negev desert, provided the basis for carrying out secret tests on the production of nuclear weapons.

A representative of the Stockholm International Institute for Research in the Problems of Peace (SIPRI), S. Lodgard, stated that if these reports correspond to reality, then Norway has in fact aided Israel's creation of nuclear weapons.

Norway's Ministry of Foreign Affairs emphasized in its announcement that it has the right, according to the 1959 contract, to carry out an inspection at any time of the 21 tons of heavy water sold to Israel, and that such an inspection will clearly reveal whether Tel Aviv has an atomic bomb.

The representative of the Norwegian Ministry of Foreign Affairs P. Paust stated in an interview with REUTER that the heavy water had been sold to a number of states on the condition that it would be used by them solely for peaceful purposes.

CSO: 5100/6

VELIKHOV ATTENDS NUCLEAR ENERGY SEMINAR IN ROME

LD061821 Moscow TASS in English 1500 GMT 6 Nov 86

[Text] Rome, 6 Nov (TASS)--TASS correspondent Aleksey Golyayev reports:

An international seminar devoted to the issues of increasing cooperation among various countries to promote a peaceful and safe use of nuclear energy opened here today. It was sponsored by the international committee "Science and Peace" and is being held under the auspices of the Italian Foreign Ministry.

Attending the seminar are famed physicists from the United States, China, the Federal Republic of Germany and other countries. The Soviet delegation is led by Yevgeniy Velikhov, vice-president of the USSR Academy of Sciences.

Antonio Zichichi, a well-known Italian scientist, told TASS that the principal objective of the meeting was to bring to the broadest possible sections of the public the opinion of leading scientists on the issue of the use of nuclear energy. Specialists should say their authoritative word on this problem and the related issues of security in the heated polemics which have erupted in the world now, he said.

The nuclear energy is the source of life for the whole of mankind. It is crucial that reason prevail in this issue.

The seminar will be at work till November 8.

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CSO: 5100/007

PRAVDA ON IAEA SESSION, NUCLEAR SAFETY

PM041015 Moscow PRAVDA in Russian 27 Oct 86 First Edition p 6

[A. Pokrovskiy article: "Realities of the Nuclear Age"]

[Text] Vienna-Moscow--The split atmo immediately showed our world its opposite faces. "Between the startup of Enrico Fermi's first installation and the startup of Igor Kurchatov's first industrial nuclear power plant lay the sinister shadow of the Hiroshima and Nagasaki tragedy" is how the situation is evaluated in the "Program for Creating an International System [rezhim] for the Safe Development of Nuclear Power" put forward by the Soviet Union at a special session of the IAEA General Conference in Vienna.

The situation has deteriorated recently. A number of accidents at nuclear power plants in various countries have "split" public opinion on the issue of the use of nuclear power. Its opponents have been sufficiently influential to force the Austrian and Danish Governments, for example, to abandon the construction of nuclear power plants on the territory of these states. They tried to influence the course of the work of the IAEA special session, which was held precisely to consider measures to strengthen international cooperation in the sphere of nuclear and radiation security. I saw four young men outside the entrance to the Hofburg Palace putting up posters calling for the renunciation of nuclear power. At the same time teletypes brought the news from China that a contract had been signed with British and French firms for the construction of a new nuclear power plant in the country. "In China," Zhao Ziyang, premier of the PRC State Council, stressed in this connection, "nuclear power plants have only a small share in the development of the power industry, but our course aimed at developing such plants as an integral part of resolving China's energy problem will not change." This is further confirmation that the number of states making increasingly active use of the power of the split atom is growing.

Thus there is a clear clash between two trends that were impartially described at the IAEA session as follows: "Many honest people are 100 percent sure that nuclear power is the chief evil. Other equally honest people are 100 percent sure of the need to continue and expand the use of nuclear power not because they like it but because they can see no other suitable alternative at present. World history has already known cases where people 100 percent sure of something have turned out to be 100 percent wrong..."

So who is right? It was to finally seek an answer to precisely this question that the world's major specialists in the energy sphere gathered in Vienna. The situation demanded a sober, realistic approach to resolving the problem. The development of this approach was largely helped, in the specialists' opinion, by the "comprehensive and very frank" report on the accident at Chernobyl prepared by Soviet experts. It was discussed by more than 500 experts in the nuclear field from all over the world and an authoritative report for the IAEA special session was drawn up on the basis of their conclusions. A special complexion was given to the session's work by the document read by the Soviet representative at the very first sitting, a document whose essence is accurately reflected in the title "Program for Creating an International System for the Safe Development of Nuclear Power." Delegates noted with satisfaction that the document is based on a contemporary approach to problems and a new level of thinking in line with the special features of the nuclear age.

Let us take a closer look at the essence of the discussions which developed at the session.

The first question was: Can the world not manage to consume less electricity in the future than it does today? Calculations in this respect were unequivocal--despite economy measures and the reduction of production energy-intensiveness, satisfying the social and economic requirements of states' developnent is inconceivable without increasing electricity generation. So another question is inevitable: How to achieve this?

At first the list of sources looks impressive even without nuclear installations--coal, oil, gas, water resources, biomass, wind, sun. But the majority of them cannot, in the foreseeable future, serve as the basis for large-scale, economical energy production. In the majority of countries there are not very many untapped water resources left. And specialists calculate, in the future planning organs can realistically rely only on coal, oil, gas, and nuclear fuel. And, as they themsleves add, the exploitation of each of them involves a certain degree of risk.

I will remind you that world statistics show that the extraction and transportation of coal,for example, cost a considerable number of lives each year as a result of accidents. The ecological consequences of burning coal and oil are still more dangerous. In this respect not only atmospheric pollution but also the emergence of the so-called "greenhouse effect" must be taken into consideration. IAEA Director General Hans Blix said this about it in his report: "The most serious problems of ecological breakdown are posed by gradual processes, some of which have global consequences. They do not attract the kind of attention attracted by a single dramatic event, such as Chernobyl, for example. However, their significance from the viewpoint of the threat to people's lives and health and the preservation of life on our planet is incomparably more serious."

It is against this background that one should evaluate the potential and the dangers inherent in the extensive use of nuclear power, which, incidentally, is cheaper and also cleaner from an ecological point of view. The following figure was quoted at the session: Before the Chernobyl accident nuclear power had accumulated 4,000 reactor-years of steady exploitation. The conclusion therefore automatically comes to mind: The positive record of nuclear power must be restored. A characteristic detail is that the leaders of the seven largest capitalist powers, who gathered in Tokyo after the events at the Chernobyl AES, considered it necessary to make a special point of saying that the proportion of nuclear power in energy production will continue to grow throughout the world--"on the condition that it is used properly."

Yes, this is a difficult matter in both the scientific and technical and the simply emotional respects. Do the different approaches to determining radiation danger levels not confuse people? In Great Britain and Sweden, for example, milk is considered unfir for consumption if it contains 2,000 becquerels of iodine-131. In Poland the level is 1,000 becquerels, in Hungary it is 500, in Austria 370, and in Hessen, in the FRG, 20.

The formulation of generally accepted international norms and approaches in the sphere of nuclear installation safety is all the more essential in view of the fact that no national borders exist for a radioactive cloud caused by an accident somewhere, for example. This is why our country's proposal to set up an international nuclear safety system met with such broad support.

Of course, there are a considerable number of complex problems here which cannot be immediately resolved. One of them is safety standards at a nuclear power plant or, to use a broader concept,the man-machine relationship. This is a burning problem for many modern technologies, including the peaceful use of nuclear power. That is why an IAEA conference on this subject is planned for 1988.

In short, there is still a considerable amount to be done. The CPSU Central Committee Politburo has noted the great importance of continuing the line of developing relations between Soviet organizations and the IAEA in every area of its activity, primarily with regard to the questions of setting up an international system for the stable, safe development of nuclear power.

The first steps in this direction were the two conventions approved at the special session of the IAEA General Conference on prompt notification of nuclear accidents and on assistance in the event of nuclear accidents or radiation emergencies. They have not only been signed by dozens of states but are actually already in effect, introducing a definite stabilizing factor into a complex sphere of international relations. It is precisely within the framework of these conventions that prompt information was given about the fire on the Soviet nuclear submarine. Incidentally, the conventions apply to incidents not only at industrial installations but also at military nuclear installations.

This is a very important point. My job as a journalist took me to the IAEA session virtually immediately after a visit to a USSR Academy of Sciences Earth Physics Institute seismic expedition and then to the Chernobyl AES. In North Kazakhstan I saw the trade on a seismogram flicker after a nuclear explosion thousands of kilometers away--in the American state of Nevada. And at Chernobyl I saw graphically for myself what can be done by radiation once it is out of control--radiation that was only a small percentage of the level of radiation present after the explosion of a small nuclear bomb. And that is why the words of B. Shcherbina, the head of the Soviet delegation, on the first day of the IAEA special session were particularly understandable: "We must look after our home. No one can try to stop the world to get off."

This was directly echoed by a statement made at approximately the same time on another continent by the American physician R. Gale, who took part in treating the victims of Chernobyl: "The accident which happened on 26 April undermines the theory of the possibility of surviving after a nuclear war."

Yes, in the history of mankind there has never been a scientific discovery more significant in its consequences than the penetration of the heart of the atom. Thirty years of experience in using its energy to meet society's socioeconomic needs is convincing evidence that the world has irrevocably entered the nuclear era. But the achievements of nuclear science and technology must serve the interests of human civilization alone.

Militarism in nuclear garb, the session noted, has created a critical situation which it is becoming increasingly difficult to control with every new spiral of the arms race. Real nuclear safety on our planet is inconceivable without ending the material preparation for nuclear war and totally eliminating the means of waging such a war. Realism in the nuclear-space age imperiously demands a new approach to international relations and the pooling of efforts by states with different social systems for the sake of ending the global arms race and radically improving the political climate in the world. The way to do this is to stop nuclear tests and ultimately free the world from nuclear weapons.

The time that has passed since the end of the session and the recent meeting between the USSR and U.S. leaders in Reykjavik confirm that our country's policy is consistently oriented toward eliminating nuclear weapons in a comparatively short time. And, conversely, American plans to deploy [razvertyvaniye] SDI threaten to pose a nuclear threat to our planet from space. A qualitatively new situation has been created as a result and the struggle for nuclear disarmament has risen to a higher level. And this means that in the course of this struggle we must make more active use of every opportunity to reinforce international nuclear safety procedures.

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CSO: 5100/007

BRIEFS

ACADEMICIAN VELIKHOV AT ROME NUCLEAR SEMINAR--The Soviet proposal for setting up an experimental Tokamak reactor was at the center of attention among participants of an international seminar of scientists, which has ended in Rome, on the topic of worldwide cooperation for the peaceful and safe use of nuclear energy. Taking part in the work of the seminar were the most prominent scientists and physicists from the United States, PRC, the FRG and a number of other countries. Velikhov, vice president of the USSR Academy of Sciences, headed the Soviet delegation. At the seminar matters were also discussed on international cooperation in ensuring the safety of nuclear power stations, the influence of various methods of production of power on the environment, and the necessity of international cooperation in the working out of thermonuclear power engineering. [Text] [Moscow Domestic Service in Russian 1130 GMT 10 Nov 86 LD] /6662

CSO: 5100/009

SPAIN

OFFICIAL REPORT ON ASCO REACTOR SHUTDOWN RELEASED

Madrid EL PAIS in Spanish 25 Sep 86 p 19

[Text] The CSN [Nuclear Safety Council] has instructed the management of the Asco nuclear power plant to increase the frequency of periodic safety checks at the plant. For the next 3 months, these checks will have to be conducted every 2 weeks. These instructions were contained in the final report prepared by CSN technical experts on the latest defects found in Asco 2. This report, which was released yesterday, makes it clear that there have been problems with maintenance at the plant.

The Nuclear Safety Council's final report on the problems found in the Asco 2 facility on 1 July and 23 August 1986 cites as fundamental causes the existence of excessive operating pressures in the hydraulic circuit of the actuator of the steam isolation valves (where the failure occurred); an excessive temperature in the oil used; and problems with the maintenance of these systems. The CSN, which authorized the plant to reopen on Tuesday [23 September], after it had been shut for a month, extended these instructions to Asco's unit 1 as well.

The CSN's deputy director for analysis and evaluation, Antonio Gea, who summarized the conclusions of the report prepared by 150 technical staff members of the high-level nuclear organization, stressed that the maintenance done at Asco 2 had been performed correctly, "even though there is always room for improvement." But despite that, the report cites maintenance problems as the ultimate cause of the defects found in the second unit of the Asco nuclear power plant.

The final report confirms the earlier predictions about the causes of the defects found in the plant's steam isolation valves. There were also incorrect instructions from the manufacturer who supplied the oil to the plant, as well as defective maintenance of the valve actuators.

While Antonio Gea emphasized the lack of gravity of the problem detected on 23 August when one of these valves would not work--since the steam moving through the affected circuit is not radioactive--it is true that the failure of two of the three valves comprising the cooling system, as it occurred on 1 July, is not even listed in the operating instructions as a hypothetical accident, as it is highly improbable.

The CSN's deputy director for analysis and evaluation reported yesterday that the CSN has not taken any punitive action against the owners of Asco. "What more punishment can there be than having the plant shut down for a month?" he asked. The losses caused by the plant's period of inactivity amount to about 5 billion pesetas.

The plant's management has pledged, as the CSN report states, to submit to the CSN a proposal designed to "improve the level of its maintenance and of its work on preventive, corrective, predictive, and incidental aspects of its operation."

7679
CSO: 5100/2402

SPAIN

VANDELLOS REACTOR PLANS MAINTENANCE SHUTDOWN

Madrid EL PAIS in Spanish 25 Sep 86 p 19

[Article by Lola Lara]

[Text] Tarragona. Next Sunday [28 September] the Vandellos I nuclear power plant, located in the Tarragona district of Baix Camp, will begin a scheduled shutdown which will last between 3 and 4 weeks, during which various general maintenance operations will be performed. These procedures are done every year, and require the hiring of about 150 people.

During this period of inactivity, the electric companies which own Vandellos I (FECSA [Electric Power of Catalonia, Inc]--23 percent; ENHER [Ribagorza National Hydroelectric Enterprise]--23 percent; Hidroelectrica de Cataluna-Hidrola--23 percent; Hidroelectrica del Segre--6 percent; and EDF [French Electric Company]--25 percent) will lose about 1 billion pesetas, which they would normally be billing if the plant were operating.

Moreover, the cost of the personnel and materials needed for the general maintenance operations amounts to approximately 100 million pesetas. The forecast for Vandellos I's electricity production for 1986 is 2.9 billion kilowatt-hours; to date, the plant has generated almost 2.3 billion kilowatt-hours, so it is perfectly feasible for it to reach the scheduled production level this year.

Vandellos I began to produce electricity in 1972. The plant has begun a complete reevaluation program of its facilities, which will last for 2 or 3 years. This program is under the supervision of the Nuclear Safety Council.

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TURKEY

BRIEFS

NUCLEAR FUEL PILOT FACTORY--Turkey's first nuclear fuel pilot factory was commissioned at the Cekmece Nuclear Research and Training Center today. Cahit Aral, the minister of industry and trade and the chairman of the Turkish Radiation Security Committee, said at the ceremony that the Turkish Atomic Energy Institute is now capable of transferring technology to other countries. Professor Ahmet Ozemre, chairman of the Turkish Atomic Institute, said that the experience and know-how acquired in this factory will make possible preparations for a factory capable of producing 180 tons of natural uranium nuclear fuel annually. He said: The factory, built solely by Turkish engineers, scientists, and technicians, was completed within 18 months at a cost of 285 million Turkish lira. Approximately 93 percent of the material used to build the factory was locally made. [Summary] [Ankara Domestic Service in Turkish 1700 GMT 30 Oct 86 TA] /8309

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